

# BITS

## computing & communications

SPECIAL EDITION

Introduction to Computing  
at Los Alamos

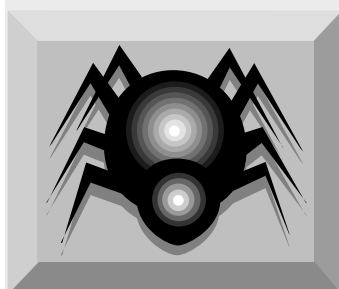
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COMPUTING, INFORMATION, AND COMMUNICATIONS (CIC) DIVISION • LOS ALAMOS NATIONAL LABORATORY

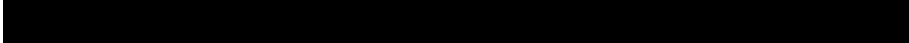


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This friendly spider indicates a connection to either the Laboratory network or the Worldwide Web (WWW, Web). When you see the spider icon, look for a path name such as **Computing at LANL/Welcome to the Integrated Computing Network** or a Web address such as **<http://www.lanl.gov>**. Further directions for using the Lab networks and the WWW are contained in this document.



*The Customer Service Group of the Computing, Information, and Communications Division (CIC) would like to present to you a special issue of BITS, our monthly computing magazine. It is our hope that this magazine complements an already existing high standard of computing customer service. This document will be updated as necessary to better meet the needs of computer users at Los Alamos.*

*On March 23, 1996, the Customer Service Group lost a good consultant and a good friend. John Wood, a computing consultant in the group for more than a decade, passed away unexpectedly. A winner of the John Norton Award for Sustained Superior Service, John represented a standard of caring about and serving users of the computing facilities that was absolutely first-class. It is with him in mind that Group members want to express their desire to make a solid, fundamental difference in getting users of LANL computers to be effective and productive, as soon as possible with a continuing high level of appropriate expertise, satisfaction, and comfort. To this end, we hope that this special issue of BITS will help all users.*

*In the back of this document, you will find a feedback sheet. Please fill it out and return it to help us to evolve this document, its format, content, and direction, so that we may best serve all computer users at Los Alamos.*

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## ACRONYM LIST

<b>Acronym</b>	<b>Meaning</b>
ACFS	Advanced CFS Interface
ACIS	Automated Chemical Inventory System
ACL	Advanced Computing Laboratory
ACS	Account Control System (for the ICN)
AIX	a version of UNIX, a computer operating system
ASDM	Adstar Distributed Storage Manager
BSD	Berkeley Software Design, Inc.
BUS	Business Operations Division
CCF	Central Computing Facility
CFS	Common File System
CFSGW	CFS gateway access
CGS	Common Graphics System
CIC	Computing, Information, and Communications (Division)
CLAMS	common Los Alamos mathematical software
CPU	central processing/processor unit
CSC	Customer Service Center
CSSO	Computer Systems Security Officer
DEC	Digital Equipment Corp.
DNS	domain name service
DoD	Department of Defense
DOE	Department of Energy
DW	Data Warehouse
ED	Employee Development
EIS	Employee Information System
EMAD	Electronic Mail Address Directory
EMR	Electronic Mail Registry
ESD	Electronic Software Distribution System
FMIS/GA	Financial Management Information System
FTP	file transport/transfer protocol
Gbyte	gigabyte
GUI	graphical user interface
HP	Hewlett Packard
HTML	hypertext mark-up language (for the Internet)
I/O	input/output
IA	Information Architecture
IA	a Labwide administration services machine
IB	a Labwide administration services machine
ICN	Integrated Computing Network
IP	Internet protocol
ISDN	Integrated Services Digital Network
JIT	just-in-time
KCS	Key Core System
LAICS	Los Alamos Integrated Communications System
LAN	local area network
LANL	Los Alamos National Laboratory
lhost	your local workstation

## ACRONYM LIST

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LPQ	line printer queue
LPR	line print request
LPRM	line printer/remove files (remove files from output queue)
LSF	Load Sharing Facility
LWW	library without walls
MIMD	multiple instruction, multiple data
MPI	message-passing interface
MPP	massively parallel processor
NCSA	National Center for Supercomputer Applications
NFS	network file server
NOC	Network Operations Center
OCSR	Organizational Computer Security Representative
ONCS	Open Network Compute Server (Cluster)
PAIRS	Property Accounting, Inventory, and Reporting System
PAGES	Print and Graphics Express Station
PAIRS	a property database
PC	personal computer
PE	processing element
PIN	personal identification number
POP	post office protocol–E-mail
PAGES	Print and Graphics Express Station
PPAGES	printing command for Macintosh file shipper
PPD	PostScript printer description
PPP	point-to-point protocol
PVM	Parallel Virtual Machine
RAID	redundant array of inexpensive drives
RAM	random-access memory
rhost	remote computer (not your local workstation)
SAS	Signature Authority System
SIMD	single instruction, multiple data
SLIP	serial line Internet interface protocol
SMTP	simple mail transfer protocol
SNCS	Secure Network Compute System (Cluster)
SR	Salary Review System
SRAM	static random access memory
ST	Stores System
T&E	Time and Effort Reporting System
T3D	a massively parallel supercomputer
TCP	transmission control protocol
TIG	terminal Internet gateway
TMC	Thinking Machines Corporation
TRIPS	Travel Reporting System
URL	universal resource locator (Web address)
VMS	Virtual Memory System
VR	virtual reality
Web	World Wide Web
WWW	World Wide Web

**Computing at Los Alamos National Laboratory (LANL) for the Uninitiated**

If you are a new employee or contractor at LANL and need to use a computer to get your job done, there may seem to be a lot to learn and do before you can get started. If you are an experienced computer user, it may be easier, but there will still be some areas of knowledge or expertise that you will need. Becoming productive within the LANL computing environment is not always easy and straightforward. This publication is meant to improve the situation.

More than likely, when you arrive at a new position, you'll already have most of the computing environment defined for you. If you are to have a computer, one will probably be waiting for you. (In fact, the Lab average says that many people will have two or more.) It will be one of three types of workstations: personal computer (PC), Macintosh, or a UNIX workstation.

Most workstations are connected to some form of network (there are many different types of connections), and some are not networked at all (they just work as standalone machines).

The reasons for this variety are quite simple:

- First, the Lab is a BIG place geographically, and it is expensive to run cables everywhere. This means that over the years some parts of the Lab have become more updated in communications technologies than others.
- Second, the computing facilities at various places in the Lab were never on a par (i.e., the weapons programs serving the Lab's primary mission tended to receive the more advanced services and facilities).
- Third, in the age of VAXes and other large-sized computers, many groups and divisions established local computing centers and, consequently, established their own standards for hardware, software, and communications.
- And, lastly, the culture of Los Alamos has always paralleled research and university cultures and has had no centralized, standardized, institutional philosophy of who ought to buy what in hardware, software, and communications.

So computing environments at Los Alamos grew in various and sundry ways, rates, and directions.

Two major initiatives are moving LANL towards a greater level of standardization.

- The first is "LANLNet," a five-year project to rewire much of the Lab to ensure a consistent standard of communications, from the port on the wall to the networking infrastructure.
- The second is the Information Architecture Project, which is a Laboratory-wide effort to address standardization of our computing, information, and communications. This effort has resulted in design guidelines, hardware and software standards, and unified processes that help create an integrated environment.

These and other factors are moving the computing environment toward becoming more interoperable, compatible, and universal.

To help you get started the following tables provide a checklist for the resources, facilities or capabilities you may need. Use the information in this publication to assist in accomplishing these tasks.

## To prepare for computing at Los Alamos :

Action	Reference	A Source for Help
Have your personal data entered into the Employee Information System (EIS).	4.2.	<b>Your Group Secretary</b>
Define the type of workstation you need.	2.1.	<b>Group CIC-2, 7-HELP</b>
Determine your network connection.	2.4.	<b>CIC-5, 7-7423</b>
Determine required networking software and hardware.	2.3.	<b>CIC-2, 7-HELP or CIC-5, 7-7423</b>
Obtain and install Netscape.	1.2.	<b>CIC-2, 7-HELP</b>
Obtain and install E-mail.	5.2.	<b>CIC-2, 7-HELP</b>
Determine if an ICN password or Smartcard is needed, and submit a validation form.	4.2.	<b>CIC-6 Password Office, 5-1805</b>

## Upon receiving your ICN password, access the Register utility to do the following:

Action	Reference	A Source for Help
Register your E-Mail address.	5.2.6.	<b>CIC-6, 5-4444*, menu option 1</b>
Register for a post office protocol (POP) server (Eudora E-Mail).	4.3.	<b>CIC-6, 5-4444, menu option 1</b>
Register for ICN computers (UNICOS, Cluster, etc.).	4.3.	<b>CIC-6, 5-4444, menu option 3</b>
Establish "authorities" for business information.	6.1.	<b>Customer Service Center, 5-4444, menu option 2</b>

\* When you call the phone number for the CIC Customer Service Center (5-4444), listed throughout this document, you will then choose from a menu that will direct you to the most appropriate source to answer your question.

Most groups or divisions have one or more people assigned to assist users with computer problems. This person, often called the "local system administrator" or "computer person" may be from CIC-2 or a member of your own group or division. Check with your group to find out who this person is as he/she is responsible for helping you with much of your setup for using computing resources.

That's a thumbnail sketch of what may lie ahead for a new computer user at LANL. The following pages have a tremendous amount of information and

may tend to overwhelm anyone that is new to LANL. However, it is all important, and this quantity of information is just the result of having a place in which a lot of things have happened in the past, and in which great things are happening in the present. Please wander through the information as you need and don't hesitate to call the Customer Service Center of CIC to get help.

**Have fun!**

**Don Willerton**  
**CIC-6 Customer Service, Group Leader**

## 1. ENTERING THE LOS ALAMOS COMPUTING ENVIRONMENT

### 1.1. About this Publication

The use of computers is becoming an increasing part of doing business at Los Alamos. While they enable us to do many more tasks, computers also may present problems, especially for new and occasional (casual) users. This publication will help make the transition to the Los Alamos computing environment quicker and more productive while reducing stress and confusion. It is designed to provide an overview of the primary computing resources at Los Alamos to get you started. It will also serve as a road map to additional information.

A computer application known as the World Wide Web is the primary repository for information at the Laboratory. Each section of this publication will provide references to Web locations that will enable you to broaden your knowledge. Within this publication, the Web location is referenced from the LANL Home Page using a path name such as

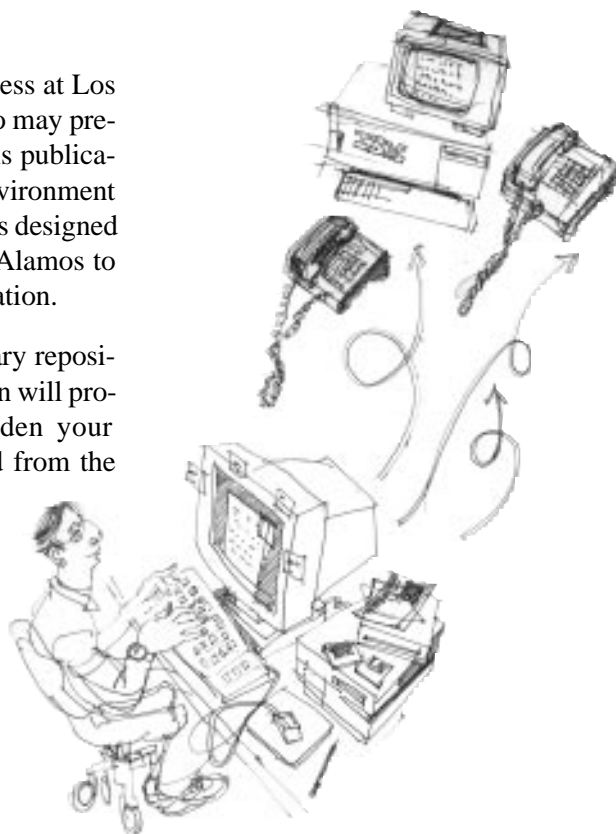


*Computing At LANL/Welcome to the Integrated Computing Network*

or to a Web universal resource locator (URL) such as



*<http://www.lanl.gov>*



Later in this section you will be shown how to set up your Web browser to access a Web URL directly [Section 1.2].

The Los Alamos computing environment can be segmented into several special interest groups. This publication is composed of seven areas to help direct you to those resources that are of primary interest to you, as follows:

- Introductory information to help establish terminology, understand your computer security responsibilities, and locate supporting resources such as the various help desk organizations [Section 1].
- How to determine your networking requirements [Section 2].
- Desktop hardware and software support and where and how software distribution and configuration are accomplished. Most users, particularly those of business systems should refer to this section [Section 3].
- Information needed to work in the ICN environment and how to use the validation, registration, authentication, and charging mechanisms. Most scientific computing users and those who have explicit networking needs should refer to this section [Section 4].
- Information needed to use the common computing resources at Los Alamos. If you have storage or printing needs, you will find this information helpful [Section 5].
- An introduction to the use of Labwide Business Information Systems [Section 6].
- An introduction to the use of scientific computing resources [Section 7].

There are three major realms of computing functions at Los Alamos, as follows:

- The “Internet Only” realm is where you can use the Web, get E-mail, run computer programs locally, print to local printers, run desktop software, etc., and don’t have to use an ICN password, a Smartcard, or any other authorizations. This realm looks like a home computer that’s tied to the Internet through an Internet provider.
- The “Administrative” realm allows you to access the administrative computers, institutional data, the LANL data warehouse, and all of the so-called Labwide functions, like Time and Effort (T&E), Property Database (PAIRS), Employee Information System (EIS), Financial Reporting System (FRS), Travel (TR), and many others. You will probably need a Smartcard and an ICN password for these functions.
- The “Compute Server” realm is focused on providing you with the large machines like Cray YMPs, CM 200s, and workstation clusters. The descriptive words are “lots of cycles,” “lots of storage,” and “lots of bandwidth.” You’ll need an ICN password for these.

The computing resources are divided into the “open” and “secure” environments. These are physically separate networks where classified computing can be performed only on the secure side. For the secure side, you’ll need a secure ICN password.

Beyond this capability, some individuals may need to tie in with the Advanced Computing Laboratory (5-7451) for research in advanced computer architectures or networking or to connect with the Grand Challenge programs.

You will be sharing the ICN with a large user community that includes Laboratory employees, visiting staff members, and people working at other facilities on diverse research efforts. This user community has a constantly expanding variety of application and performance requirements that make it necessary to provide support for a wide range of hardware and software.

Many of the resources of the ICN are located at Los Alamos in Technical Area-3 (TA-3), Buildings SM-132 and SM-1498 (the Central Computing Facility—CCF). The ICN and the computing resources it provides are supported and maintained by the CIC Division.

## 1.2. The World Wide Web (WWW)

The WWW is a tool to enable researchers in many different fields to locate on-line information that pertains to their particular fields of study. The Web provides a suite of functions including the following:

- text retrieval,
- keyword searches,
- file transport/transfer protocol (FTP) file retrieval,
- access to Telnet-based servers, and
- retrieval and display of graphic files.

The Web can be run from a text-based workstation using Lynx (Gopher is no longer available) or from “browsers” such as Netscape. It is very important that your workstation have the Telnet feature installed and properly configured. If you are unsure if this capability is available to you, check with your system administrator.

To access the Web you need the following:

- A workstation such as a Macintosh, PC or UNIX platform,
- A physical connection to the Los Alamos network,
- A logical connection (Telnet), and
- A Web “browser” such as Netscape (site license is available).



*Computing at LANL/Software  
Distribution via On-line/  
Electronic Software  
Distribution*

Access the Web by entering the appropriate browser command (MOSAIC, NETSCAPE, etc.) or click on the related icon. Although many functions are intuitive, there may be a button on the browser labeled “HANDBOOK” or “HELP,” which will lead you to additional information on using the Web.

The “home page” is the beginning point for entry into a primary Web information environment. To go directly to a Web site or home page, you can use its URL. There are several types of URLs, but the form that selects a Web site for browsing is similar to <http://www.lanl.gov>.

To enter a URL select “File” from the main menu on the Web browser and, from the menu displayed, click on “Open Location” (Netscape) or “Open URL” (Mosaic). This will open a small window into which you will type the desired URL and then click “Open.”

If you have set your browser to default to the LANL home page, then clicking on “home” will take you to the LANL home page. From this home page you can click on any underlined or highlighted topic to move you through the LANL Web pages and link to the information contained there. To establish LANL as your home page,

- From Netscape pull down the “Options” menu,
- Click on “General Preferences,”
- Click on the “Appearance” tab,
- In the “Startup” area under “Browser starts with:” click in the “Home Page Location” box,
- Type: [//www.lanl.gov](http://www.lanl.gov), and
- Click the “OK” button.

If a Web reference returns the error “Unable to find Application” this may be caused by the need to configure your browser to point to a telnet application. To accomplish this open Netscape and select:

```
Options
  Preferences
    Applications (not Helper Applications)
```

Enter the following workstation-dependent information:

	UNIX	PC	Mac*
Telnet Application:	xterm -e telnet %h %p	c:/pctcp/wtnvt.exe	click on browse select telnet
TN3270 Application:	xterm -e tn3270 %h	c:/pctcp	
Rlogin application:	xterm -e rlogin %h	N/A	
Rlogin with User:	xtrem -e rlogin %h -l %u	N/A	
Temporary Directory:	/tmp	c:/temp	
*Must have NCSA Telnet installed			

### 1.3. Overview of Los Alamos Computing Resources

The ICN is LANL's primary computer network. It provides controlled access to and support for a wide variety of computing resources. These resources generally fall into one or more categories as follows:

- Network services for access to the Internet with support for connectivity to local area networks (LANs) at LANL— permits log-in from dial-up and remote computers;
- Registration services for compute servers, E-mail, and software distribution;
- Common support services such as storage, output routing, E-mail distribution;
- Business support services for Laboratory-wide administrative systems;
- Large-scale scientific computing; and
- General desktop computing.

This section provides a brief definition of the following resources and services:

Clients and Servers	Common File System (CFS)
Compute Servers	Adstar Distributed Storage Manager (ADSM)
Networks	Network File Server (NFS)
Communications	Import/Export Service (IES)
Terminal Internet Gateway (TIG)	Print and Graphics Express Station (PAGES)

#### Clients and Servers

Servers are computers that perform specialized services for many users or for other computers in the network. The recipient of these services (such as your workstation) is called a "client." There is a variety of servers that perform such functions as computing, security, data storage, information retrieval, E-mail, accounting, and production control.

## Compute Servers

Compute servers or workers execute user programs to perform numerical computations that are at the heart of most scientific and engineering applications. A variety of compute servers employ different operating systems.

- UNICOS on CRAY computers in both the open and secure environments,
- UNIX (AIX, HP/UX) on Cluster Systems and Machine Beta,
- UNIX Sun workstations and front-end processors for the Connection Machine, and
- VMS on Digital Equipment Corp. (DEC) Alpha computers, as well as
- The Labwide administration services IA and IB.

The computers are generally identified by a short name such as “rho” or “delta.” Some computers provide for specialized applications such as IA and IB.

## Networks

The ICN uses the TCP/IP (Internet) protocols originally developed for the Department of Defense (DoD) “ARPANET,” and are now the most widely used internetwork protocols. Most vendor and third-party software assumes the presence of TCP/IP.

TCP/IP and the UNIX operating system provide a foundation on which CIC Division has built a distributed computing environment. Because this foundation is constructed from standard hardware and software, ICN users are able to take immediate advantage of the many tools and software applications available from all over the world. Use of these tools permits workstations, supercomputers, and specialized processors to be linked into a single, integrated computing system—the ICN.

Each ICN security environment is networked independently. There are no connections between the open and secure networks.

## Communications

Communications into the ICN are handled by specialized computers in the CCF that direct, validate, and control your communications to the ICN resources in a way that is almost transparent to you. Both network connectivity (TCP/IP) and dial-up service (ISDN) are provided.

## Terminal Internet Gateway Services (TIG)

The TIG permits access to Laboratory computers or to Internet hosts from asynchronous terminal emulators (VersaTerm, TN3270, etc.) from dial-up or dedicated port selectors.

## Common File System (CFS)

The CFS is a large central data storage and retrieval system for the worker computers and distributed processors. The CFS is used for long-term and archival storage.



*Computing at LANL/  
Welcome to the ICN.../  
Operating Systems Review*



*Computing at LANL/CIC Groups,  
Centers, Affiliates/  
CIC-7 Computing/  
Worker Systems*



*Computing at LANL/  
Network Services.../  
Cluster Information*



*Computing at LANL/CIC-5 Net-  
work Engineering*



*Computing at Lanl/CIC-4  
Telecommunications*



*Computing At LANL/  
Network Services and Resources/  
Terminal Internet Gateway*



*Computing At LANL/  
CIC Groups, Centers.../  
CIC-11 Storage Systems/CFS*

*Computing At LANL/  
CIC Groups, Centers.../  
CIC-11 Storage Systems/ADSM*



### **Adstar Distributed Storage Manager (ADSM)**

ADSM is a file storage and backup service available in the open partition. It provides automated file backup of workstations and personal computers and has an archival file storage capability for large files.

*Computing At LANL/  
CIC Groups, Centers.../  
CIC-11 Storage Systems/NFS*



### **Network File Server (NFS)**

The NFS is an ICN service that allows UNIX files to be located remotely and yet appear to be local to compute servers and workstations. NFS promotes distributed computing by allowing data to be computed on supercomputers and results displayed on a workstation without requiring the user to move files.

### **Import/Export Service (IES)**

IES provides a general way to move electronic files into and out of the Laboratory in a secure way using popular forms of media. The IES supports 1/2-inch 3490 tapes as well as 4-mm, 8-mm, and 1/4-inch tapes at several densities. The export function copies entire CFS trees onto tapes in a "tar" format that can easily be restored to CFS or some other system in the future. The import function provides for a binary transfer of tape files into CFS.

The Mercury system provides the capability to move unclassified data between the secure and open networks in a secure, controlled, and auditable way. Because of some of the ways we have had to implement security requirements, there may be several hours delay when moving data in this manner.

*Computing At LANL/  
CIC Groups, Centers.../  
CIC-17/PAGES*



### **Print and Graphics Express Station (PAGES)**

PAGES provides centrally located hard copy devices such as film recorders, plotters, and high-speed laser printers for your text and graphics output.

## **1.4. Computer Security**

Computer security is something we at LANL take seriously. As an ICN user you are required to follow security policy that is set by the DOE. Failure to follow this process will result in removal of your ICN computing privileges, possible discipline (administrative reprimand, security infraction, or even termination), and/or prosecution when deemed appropriate. Please know what is required of you!

The ICN is divided into two computing environments to provide flexibility in services and protection for classified and sensitive information. You must always be aware of the environment you are working in and the security level of the material you are working with.

- The open/administrative environment is used for processing unclassified and unclassified sensitive data only.
- The secure environment is used for processing secure, unclassified material; secure, classified material, and national security material.

All users at LANL are required to have training in computer security. The Computer Systems Security Officer (CSSO) and Organizational Computer

Security Representative (OCSR) for your organization are responsible for providing your training. If you are unsure who your CSSO and OCSR are, ask your manager.

All Laboratory computers, computing systems, and their associated communication systems are to be used only for official business and must be protected in accordance with property protection and security rules. In addition, software must be legally procured, and you must maintain records of ownership, such as proof of license requirements, software documentation, or the original application disks, to prove that you are the authorized owner. You must not duplicate or use copyrighted or proprietary software without proper authorization.

**FILE AUDITS**—Your management, OCSR, CSSO, the Facilities Safeguards and Security Division, the CIC Division, and DOE have the authority and the responsibility to audit your files on any computing system used for Laboratory business to ensure that you abide by these rules.

**UNREQUESTED OUTPUT**—If you receive output from the ICN that you did not request (such as hard copy printout or a display on your workstation), contact the ICN Password Office (665-1805) during normal working hours. Between 5:00 p.m. and 8:00 a.m. (local time) and on weekends/holidays, contact the CCF supervisor (667-4584).

**ICN ANOMALY DETECTION**—To ensure the security of your ICN computing files and activities, the network is regularly scanned for anomalies (such as a large number of failed log-on attempts). These are investigated and, if deemed suspicious, are called to your attention.

#### **1.4.1. Responsible Use of LANL Computing Resources**

LANL computing resources are for “official use only” which means any use justifiable as being related to the conduct of Laboratory business. Official use includes activities obviously required for one’s job, such as engineering computations, scientific research, sharing technical information for review, comment and information exchange, technical collaboration as part of one’s research activities, office correspondence, and administrative record keeping.

“Unacceptable use”—activities that constitute unacceptable use of Laboratory computers or network facilities include the following:

- Use of government equipment for personal gain,
- Use for political purposes (e.g., lobbying),
- Illegal or immoral activities (e.g., fraud, embezzlement, theft, pornography),
- Unauthorized entry to other computers or networks or distributing viruses,
- Misusing or forging E-mail, or tampering with the Laboratory E-mail system,
- Activities likely to result in embarrassment to the Laboratory or DOE, (e.g., reading or distributing pornography, making libelous statements),
- Any activities explicitly prohibited by LANL policy (e.g., sexual harassment, gambling), and

- Use that interferes with job performance for an unauthorized purpose (e.g., using a Lab laptop to calculate sports statistics or balance a personal checkbook).

#### **1.4.2. Protecting Passwords and Smartcards**

All ICN passwords and Smartcard PINs must be protected, regardless of whether they are used for unclassified or classified processing. If you are an ICN user, you are responsible for the proper storage and handling of your password and/or Smartcard and PIN. By signing a receipt for your ICN password and/or Smartcard, you agree not to misuse the ICN and to be responsible for activity associated with your user number and password/Smartcard PIN.

ICN passwords and Smartcard PINs for unclassified access are sensitive information (official use only) and must be handled accordingly. Passwords for classified computing are considered Secret, National Security Information, and if written down, become classified documents. They must be marked and stored according to standard Laboratory procedures for marking and handling classified data.

- DO NOT give anyone your password or Smartcard PIN or allow anyone to use them to gain access to the Laboratory's computers.
- DO NOT leave your password or Smartcard PIN where others may view them. Never tape them to your terminal!
- NEVER store your ICN password or Smartcard PIN on-line or on any computer or terminal.
- If you think your password or Smartcard PIN has been compromised, change it using the Register facility or contact the ICN Password Office immediately.

#### **1.4.3. Responsibilities Upon Termination**

If you terminate from LANL or a contract organization and are an ICN user, there are several things you need to do before you leave.

- Destroy documentation that contains password or Smartcard PINs.
- Return Smartcards to your group office.
- Remove machine authorizations using the Register facility.
- Delete or give someone else full access to your files on CFS (They will not automatically go away when your account is removed from the ICN).

#### **1.4.4. Use of Personal Computers Off-site**

Personal computers may be used for Laboratory business off-site when the following conditions are met:

1. Laboratory rules for removing and protecting government property, as applicable, must be followed. (Material Management Manual, Section 1).
2. All Laboratory-owned systems processing off-site are subject to the Laboratory's Computer Security Program's policies and procedures.
3. All non-Laboratory-owned systems processing sensitive unclassified information off-site are subject to the Laboratory's Computer Security Program's policies and procedures.

4. Standalone off-site systems are for processing unclassified information only.
5. Individuals processing information off-site may be held personally liable financially for its loss, damage, destruction, or unauthorized disclosure while it is in their custody (Laboratory Office Procedures Manual, Section 7-2).
6. All software on Laboratory-owned systems that are used for off-site processing shall be properly licensed and shall be virus-tested.
7. The use of privately owned software on systems that are processing off-site is permitted if the software is fully licensed and has been virus-tested.
8. Laboratory-owned systems require a software review and virus check when returned to the Laboratory.
9. All Laboratory-owned systems are subject to being called back to the Laboratory for an audit by security and/or management officials.

#### 1.4.5. Use of Non-Laboratory Computers On-site

Non-Laboratory-owned microcomputers/word processors (systems) may be brought on-site for Laboratory work when the following conditions are met:

1. Systems are to be used for processing unclassified information only.
2. Each system must have a properly executed “Non-Laboratory Owned Systems at LANL” form kept with it at all times.
3. Non-Laboratory owned systems may not be connected to any other computing or telecommunication resource unless prior written approval is given by organization management and the OCSR. When a non-Laboratory system is connected to a Laboratory computing resource or telecommunication resource, it immediately becomes subject to the Laboratory Computer Security Program’s policies and procedures, and a certified Addendum to the Master Computer Protection Plan must be on file with the responsible OCSR.
4. For systems that are to be on-site for 90 days or longer an approved/certified Addendum must be on file with the OCSR, and you must have read and signed the “Users Computer Security Responsibilities” form.
5. Non-Laboratory-owned systems shall not be taken into a technical security area without prior approval from DOE.
6. All software on non-Laboratory-owned systems shall be fully licensed.
7. All software and information on non-Laboratory-owned systems shall be virus-tested. Virus testing shall be performed on a continuing basis.
8. All non-Laboratory-owned systems that are brought on-site are subject to audit by security and/or management officials.



*Information By Organization/  
Facilities Safeguards and  
Security Division*

## 1.5. Consulting and Training Services

Because of the wide variety and diverse nature of CIC services, there are numerous facilities available to address your computer questions. The structure of these services is such that if you are uncertain whom to call, you can always contact the primary Customer Service Center (CSC) number (665-4444, follow the menu options) for referral to a more appropriate source.



*Computing at LANL/CIC-6 Customer Services/Services and Teams*

- Option 1 (CSC) For new users, E-mail, passwords/Smartcards, WWW, or log-in;
- Option 2 (LabWide) For Labwide business information systems;
- Option 3 (ICN) Scientific computing, storage systems, or networks;
- Option 4 (Training) For information about classroom training;
- Option 5 (Other) For any other questions.

There is no charge for these services, which (with few exceptions) are available Monday through Friday, 8:00 a.m. to 5:00 p.m. local time.

#### **CIC Customer Service Center—CIC-6**

This group provides a one-stop number for any question about services in CIC Division. Most questions concerning E-mail registration, ICN validation, the Web, charge codes, and POP servers will be answered at this level. If the question cannot be answered here, you will be referred to a second-level source.

Voice: 505-665-4444, option 1

FAX: 505-667-5304

E-mail: cichelp@lanl.gov

#### **Lab-wide Business Systems—CIC-6**

CIC-6 provides consulting for on-line business information systems used throughout the Laboratory such as the Employee Development System; PAIRS, the system property administrators use for property accounting; or TRIPS, the system for domestic travel requests.

Voice: 505-665-4444, option 2

FAX: 505-665-6647

E-mail: Labwide@lanl.gov

#### **ICN Consulting Office—CIC-6**

This office provides consulting services to you on a wide variety of topics that typically relate to scientific or engineering computing as follows:

- Programming languages (in particular FORTRAN and C),
- System libraries,
- Graphics libraries,
- Utilities,
- Command languages,
- Assistance with debugging codes,
- Use of controllers, and
- Network communications.

Voice: 505-665-4444, option 3

FAX: 505-662-5304

E-mail: consult@lanl.gov

**External Computing—CIC-6**

This organization provides administrative support to external users. E-mail [external\\_computing@lanl.gov](mailto:external_computing@lanl.gov) or call 505-665-4444, option 3.

**Desktop Support Services —CIC-2 Help Desk**

The Desktop Support Team is available to all LANL employees and contractors. When you call 7-HELP (7-4357), you can choose from the following computer support via your touch-tone key pad or E-mail:

1. Ask PC hardware questions,
2. Ask PC software questions,
3. Ask Macintosh hardware or software questions,
4. Get information on UNIX or LAN non-contract systems,
5. Get information on UNIX or LAN contract systems,
6. Get information on The CIC-2 PC Store,
7. Leave feedback about quality of service, and
8. Speak to a receptionist.

Operating out of the Desktop Support Center in TA-3, SM-30, Room W124, it also provides a Demo Room where sample hardware is available for trial, and vendors routinely offer presentations on various hardware and software products.

The CIC-2 PC Store and Shop offers a limited selection of computer products for sale, such as cables, mice, and Ethernet cards as well as a small-computer rental program. A hardware repair shop is available for computers and computer peripherals. On-site computer service can also be requested.

CIC-2 also maintains a software lending-library service. Software applications for PCs and Macs may be checked out for evaluation. Along with the lending library, CIC-2 also distributes some software. Please call 7-3194 for a list of available software.

**Network Operations Center (NOC)—CIC-5**

For most network problems you should call the Customer Service Center (5-4444, option 3). However, if you have specific network questions, you can call the NOC directly.



*Computing at LANL/CIC-5 Net-  
work... /Operations*

The NOC manages the LANL open Internet, diagnoses and repairs LAN and data communications problems, operates secure communications circuits, and is the main point of contact for network customer service. The NOC maintains the host-name-to-address database (domain name service—DNS) and other basic network information services. It maintains configuration databases for active components that make up the network (routers), and it monitors network performance.

Voice: 505-667-7423 7 a.m. to 5 p.m. local time (on working days)

FAX: 505-667-4584 (off hours)

E-mail: [noc@lanl.gov](mailto:noc@lanl.gov)

The hostmaster adds, changes, and removes information about computers on the LANL networks kept under DNS.

hostmaster@lanl.gov 505-667-7423

*Computing at LANL/Training*



*Information by Organization/  
Human Resources Division/  
Training & Development/.*



### **Computer Training—CIC-6**

The CIC-6 Training, Development, and Coordination Team, in concert with other groups and divisions, offers a wide variety of training programs to assist you in making the best use of computing resources.

Three primary areas of training are coordinated by CIC-6, as follows:

- Labwide business information systems (Data Warehouse, T&E etc.),
- In-house computer training (UNIX, Networking, Eudora, HTML, etc.), and
- Vendor computer training (Framemaker, Oracle, C, etc.).

A complete list of training courses and schedule dates is available from WWW.

PC and Macintosh applications training (such as Excel, Windows, etc.) is coordinated by the Human Resources Division, Training and Development Group, 7-9071.

If you are unsure of what kinds of training are available or how you might benefit from training, you are encouraged to call the CIC-6 Training Office (7-9559) for personal consultation.

Voice: 505-665-4444, option 4

## 2. Determining Networking Requirements

The ICN is an important tool in accomplishing the Laboratory and Department of Energy (DOE) goal of electronically linking all employees. Full participation in research, development, and administrative activities will increasingly require the kind of electronic access the ICN and the Internet make available to Laboratory employees, associates, and contractors.

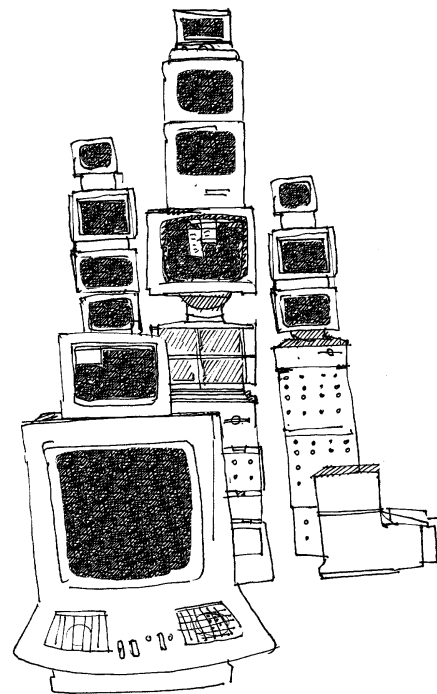
The ICN is connected to the Internet, a worldwide collection of computer networks whose users can communicate with each other using a variety of networking applications. If your workstation is a part of the ICN, you can access remote computer resources, order supplies, access airline schedules, or use the "Information Superhighway" (Internet) to perform a variety of other activities. If you need Internet or ICN access, the following questions must be addressed:

### 2.1. What Type of Workstation Is to be Used?

There are three primary types of personal workstations that are supported at Los Alamos: PC (and PC clone), Macintosh, and UNIX-based workstations (Sun, SGI, etc.). Call CIC-2 (7-HELP) for assistance in determining what type of workstation is best suited for your environment and applications.

### 2.2. What Types of Communication Links Are Available?

There are several types of communication links that may be used to connect to the ICN. Your specific work area may limit your selection. However, depending on the types of applications that are required, you may elect to have upgraded communications installed. Call CIC-5 (7-7423) for assistance in determining what is available. CIC-5 can also help you select an appropriate modem for dial-up connection. Table 1 describes the primary communication links.



**Table 1. Type of Communication Link**

Link	Data Rate	Description
<b>Local Area Network (LAN)</b>	10 MB	Provides a direct high-speed link (TCP/IP) to the ICN/Internet [see Table 2]
<b>ISDN</b>	57.6 kB	Access the ICN/Internet via Lab phone links to the TIG. Your workstation must use an appropriate emulator [see Table 2]
<b>Telephone Dial-up Link</b>	28.8 kB	Access to the ICN/Internet via common carrier (U S West, etc.) to TIG. Your workstation must use an appropriate emulator [see Table 2]
<b>Micom Port Switch</b>	9.6 kB	Old hard-wired ports being phased out by ISDN

### 2.3. What Communication Hardware/Software Is Needed?

Depending on the type of communication link chosen, your workstation may need the software identified in Table 2. CIC-2 can assist you in selecting, installing, and configuring your network hardware and software.

**Table 2. ICN Workstation Communication Requirements**

Type of Workstation	Type of Connection	Communication Link		
		ISDN 57.6 kB	Dial-up 28.8 kB	LAN 10mB
Macintosh	Serial	VersaTerm Pro	Modem VersaTerm Pro	N/A
Macintosh	SLIP	MacSLIP or VersaTerm SLIP (serial cable)	Modem MacSLIP or VersaTerm SLIP	Ethernet Card IP Address
	*PPP	MacSLIP serial cable	Modem MacSLIP	Ethernet Card IP Address
PC	Serial	VTERM	Modem VTERM	N/A
PC	SLIP	Trumpet or OnNet (PC/TCP) (serial cable)	Trumpet or OnNet (PC/TCP) (serial cable)	Ethernet Card IP Address
	PPP	Trumpet	Trumpet	
UNIX Platform (Sun, SGI, etc.)	TCP/IP (Ethernet)	N/A	N/A	Standard Hardware and Software Connectivity

\*(point-to-point protocol)

#### Definitions for “Type of Connection”

**Serial**—A relatively slow link that employs terminal emulators to pass data, one character (byte) at a time.

**TCP/IP**—protocol that is typically used as the primary method of communications for Ethernet LANs.

**SLIP and PPP**—allow ISDN and dial-up connections to work with ICN/Internet protocols. When used, they connect to the ICN through the TIG, a special entry point that allows you to perform functions (Telnet/FTP) and applications with Internet computers.

### 2.4. What are the Networking Software Requirements?

With the link established and the networking communication installed, you can use Table 3 to identify the software that will provide for the functions or resources noted.

**Table 3. Workstation Networking Software Requirements**

Type of Workstation	Function or Resource	Required Software
<b>Macintosh</b>	Telnet	National Center for Supercomputer Applications (NCSA) Telnet or VersaTerm Pro
	FTP	Fetch, or VersaTerm FTP Client
	3270 Emulator	TN3270 (requires MacTCP installed)
	POP	Eudora/Netscape 2.0 or higher
	PAGES	MacPPAGES or Appletalk Zone & PAGES software
	CFS	Use FTP Client to “ftp cfsgw.lanl.gov”
	WWW	Netscape (preferred) or Mosaic
<b>PC</b>	Telnet	FTP's WTNVT (PC/TCP)
	3270 Emulator	WTN3270
	POP	Eudora/Netscape 2.0 or higher
	PAGES	PAGES software & net access to PAGES
	CFS	Use FTP Client to “ftp cfsgw.lanl.gov”
	WWW	Netscape (preferred) or Mosaic
<b>UNIX</b>	Telnet	Telnet
	FTP	FTP
	3270 Emulator	X3270
	POP	Netscape 2.0 or higher
	PAGES	PPAGES
	CFS	Use CFS utility or FTP Client to “ftp cfsgw.lanl.gov”
	WWW	Netscape (preferred) or Mosaic. Lynx (ASCII only)

### 2.5. What are the Resource Access Requirements?

To access the ICN computers and resources, you will need to have a variety of requirements fulfilled as noted in Table 4. Call the Customer Service Center (5-4444, option 1) for assistance in determining what requirements you need to access specific resources.

**Table 4. Resource Access Requirements**

<b>Application Resource</b>	<b>Access Limited By<sup>2</sup></b>	<b>Authentication (Kerberos)<sup>4</sup></b>	<b>Password<sup>3</sup> Required</b>
<b>IA or IB</b>	Authorities	yes	ICN password from admin env.
<b>IA (Labwide)</b>	Authorities	no	passcode from open environment
<b>IB (Labwide)</b>	Authorities	yes	ICN password (accessed via IA) no passcode if accessed directly via +n 3270
<b>Register/EMR<sup>1</sup></b>	Entry in EIS	no	ICN password or Smartcard
<b>UNICOS/UNIX</b>	Registration	yes if Klogin fm wkstn	ICN password or Smartcard
<b>Cluster</b>	Registration	yes if K4login fm wkstn	ICN password or Smartcard
<b>VMS</b>	Registration	yes	VMS password
<b>POP</b>	Registration	yes	POP password
<b>PAGES</b>	Valid charge code	yes from workstation	no
<b>CFS</b>	Valid charge code	yes from workstation	must have Kerberos ticket first

<sup>1</sup>Electronic Mail Registry

<sup>2</sup>A definition of each access limitation is in Table 5.

<sup>3</sup>A definition of each type of password is in Table 6.

<sup>4</sup>A description of Kerberos Authentication is found in Section 4.4.

### 2.6. Connecting to LANL from Home or Travel

If you are at home or on travel, there are a variety of ways to connect to the ICN, but to take full advantage of ICN services, the minimum connection should be SLIP or PPP over a telephone line. This will assure you of access to LANL-only services because you will effectively have a LANL Internet Protocol (IP) address. To connect to the ICN with SLIP or PPP you will need the following:

- Laptop or home computer with at least a 9600 baud modem [see Sections 2.1 and 2.2],
- Telephone line,
- ICN phone numbers [Section 5.1.4],
- ICN password or Smartcard (if you need access to the Admin partition) [Section 4.1],

- Set the default charge code if using the 800 number [Section 4.5],
- Install TCP applications software (may come with SLIP, PPP),
- Install SLIP or PPP software [Section 2.3],
- Configure network information for the ICN [Section 4.3], and
- Establish a POP account (to use a POP mail tool like Eudora) [Section 5.2.7].

The following will help you estimate the cost (1996 rates) to connect to the ICN with SLIP or PPP:

- ICN password (\$7.00/month)
- Local dial-up (\$0.02/minute)
- FTS800 dial-up (\$0.14/minute)
- ICN POP account (\$21/month). Some groups maintain their own POP service.
- Software (varies)—commercial software, shareware, and freeware are available.
- Modem (\$150-\$400)
- Installation and configuration (varies)—call CIC-2 7-HELP or your group's computer support staff.
- Smartcard (\$150)—good for three years

## 2.7 Network Information to Configure for the ICN

When configuring your PC or Mac for network and E-Mail access, the following information will typically be needed:

Server	Name	IP Address
nameservers	lanl.gov	128.165.4.4 192.16.1.2
mailhost	mailhost.lanl.gov	128.165.3.12
newshost	newshost.lanl.gov	128.165.3.8
timehost	timehost.lanl.gov	128.165.4.4

**Table 5. Description of Access Limitations**

Access Limitation	Description
<b>Authorities</b>	The Laboratory-wide business applications permit each employee to view only selected portions of business files. Greater access can be provided by your group leader or the Labwide Consulting Office.
<b>EIS</b>	You must have an entry for yourself to register for ICN resources or use the EMR.
<b>Registration</b>	Allows each employee to validate himself/herself on the various ICN resources.
<b>Charge codes</b>	The cost center and program codes to which your computing use is charged. Your group secretary should provide this information.

A definition of each type of password is found in Table 6.

**Table 6. Types of Passwords**

Access Limitation	Description
<b>ICN Password</b>	An eight-character string (issued by the ICN password-generation program or the Password Office) that permits access to ICN resources. There are different passwords for each level of computing (open, secure/unclassified, secure/classified etc.).
<b>Passcode</b>	A six-digit number derived from a Smartcard that permits access to the administrative partition from workstations in the open environment.
<b>POP Password</b>	A six-to-eight character (user selectable) password selected at the time of POP registration. This is not considered a secure password; thus, the ICN password must never be used for this.
<b>VMS Password</b>	A six-to-eight character (user selectable) password selected at initial log-in. The default for initial log-in is your user number.
<b>Secondary Password</b>	A six-to-eight character (user selectable) password for multiuser workstations (UNIX).

## 2.8. Networking Functions

There are several basic networking functions that permit you to use computing and network resources in remote locations.

- Remote log-ons (Telnet and KLOGIN) permit you to work through your local workstation (lhost) to a remote host (rhost). Using a workstation windowing environment, you can be logged in to several hosts simultaneously and move between the windows as tasks demand. Refer to the log-in section for information about the log-in process [Section 5.1].
- File transfer operations (FTP, CFS, NFS, ASDM, Fetch) allow you to move files between a remote host or file server and your workstation. Refer to the file transfer section for information about these functions [Section 5.4].

While these networking functions are usually performed explicitly, they may be embedded in applications and appear transparent. Some of these functions may not be available unless the appropriate software has been installed on your workstation.

Additional network applications include E-mail and the WWW; both are covered in later sections of this document.

### 3. DESKTOP HARDWARE AND SOFTWARE

#### 3.1. Desktop Support

The CIC-2 desktop support group provides a one-stop shop for hardware, software, and networking support of Laboratory desktop systems, applying emerging desktop technology to solve critical Laboratory needs.

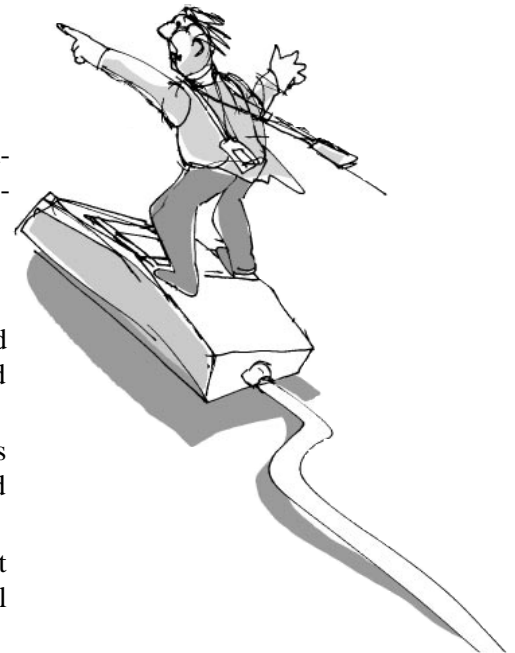
Three Web categories of particular interest to desktop users are as follows:

- /ESD (electronic software distribution), which allows LANL-affiliated individuals to register, verify licensing, and download commercial and shareware software using the Web;
- /Hotlist, links to JIT vendors and important desktop computing sites including large companies, vendor directories, and other hardware and software resellers; and
- /Helpdesk Information, which provides more about the technical support services offered by CIC-2. Use this area to send your questions via E-mail to the support staff.

To help you select the most appropriate computing environment, you should make a list of the types of uses you may have (word processing, graphics packages, programming, etc.), your network environment, and the performance expectations. CIC-2 can provide technical assistance to set up and install software and/or hardware with technicians who come to your work area.

If you need a replacement system for the duration of a repair or simply a temporary system for a special purpose, CIC-2 offers an equipment rental program and a software library to allow you to evaluate software packages before committing to a purchase. If cost is a concern consider looking at the Swap Shop.

The Information Architecture team has published standards for desktop systems that include recommended hardware and software configurations at LANL as shown in Tables 7 and 8.



*Computing at LANL/  
CIC Groups.../  
CIC-2 Desktop support*



*Information by Subject/swapshop*



*Information by Subject/  
Information Architecture Project*

**Table 7. General Desktop Software**

Category	PC	Mac	UNIX
<b>A. Basic Business Applications</b>			
1. Word Processor <sup>1</sup>	Microsoft Word or Word Perfect <sup>2</sup>	Microsoft Word or Word Perfect <sup>2</sup>	FrameMaker <sup>3</sup>
2. Spreadsheet	Microsoft Excel or Lotus 123 <sup>2</sup>	Microsoft Excel or Lotus 123 <sup>2</sup>	Lotus 123
3. Presentation Graphics	Microsoft Powerpoint	Microsoft Powerpoint	FrameMaker <sup>3</sup>
<b>B. Calendar/Scheduling<sup>4</sup></b>	MeetingMaker	MeetingMaker	MeetingMaker (via Solaris server)
<b>C. Groupware<sup>5</sup></b>	Lotus Notes	Lotus Notes	Lotus Notes
<b>D. On-line Forms (HTML)</b>	For passive forms, use Jetform Filler.	For passive forms, use Jetform Filler.	Web-based Forms
	For interactive forms, use Web-based Forms (HTML).	For interactive forms, use Web-based Forms (HTML).	

**Notes for Table 7:** Products are placed in the category for which they were designed rather than for which they might be used.

<sup>1</sup> When more than one product is listed as a standard for a given computer, the list is preferentially ordered; the first item is the standard for new acquisitions.

<sup>2</sup> The 3270/EBCDIC emulation is needed only for IBM mainframe access.

<sup>3</sup> Use Adobe Acrobat Reader to view portable document format (PDF) files. Use Adobe Acrobat Exchange to generate and view such files. PDF is recommended for institutional electronic document distribution and viewing.

<sup>4</sup> Windows 95 will be addressed in a forthcoming Laboratory-wide request for comment issued by the Information Architecture Project (3/96).

**Table 8. Basic Desktop Software**

Category	PC	Mac	UNIX
<b>A. Communications</b>			
1. E-mail	Eudora (commercial version)	Eudora (commercial version)	Comes with the machine. Netscape or Mosaic <sup>1</sup>
2. Internet Browser	Netscape or Mosaic <sup>1</sup>	Netscape or Mosaic <sup>1</sup>	
3. Terminal Emulation (via TCP/IP) <sup>2</sup>	PC/TCP version 2.3 or higher (FTP Software, Inc.).	Use Versaterm or NCSA Telnet for VT/ASCII emulation.	Use the software that comes with the machine for VT/ASCII emulation.
	Use Telnet Wtnvt for VT/ASCII emulation.	Use TN-3270 for 3270/EBCDIC emulation.	Use x3270 for 3270/EBCDIC emulation.
	Use Wtn3270 for 3270/EBCDIC emulation.		
4. File Transfer (FTP client)	WS_FTP	Fetch 2.1.2 or higher	Comes with the machine.
	For PC/TCP, use the FTP client included in the PC/TCP package.	For Versaterm, use the FTP client included in the Versaterm package.	
<b>B. Electronic Document Distribution and Viewing<sup>3</sup></b>	Adobe Acrobat	Adobe Acrobat	Adobe Acrobat
<b>C. Operating System<sup>4</sup></b>	Use DOS 6.0 or higher for Windows 3.1 or higher or use Windows NT.	MacOS System 7.5	Comes with the machine
<b>D. Protection</b>			
1. Virus detection	Virex or Data Physician <sup>1</sup>	Virex or Disinfectant <sup>1</sup>	N/A
2. Password and Screen Lock Protection	Use the software that comes with Windows.	For simple passworded screen lock, use Darkside of the Mac.	Comes with the machine.
	For startup and file protection, use Norton Disklock.		
<b>E. Utilities</b>			
1. Diagnostic	Norton Utilities	Norton Utilities	Comes with the machine.
2. File Decompression	PKUnzip	StuffIt Expander	Comes with the machine.

**Notes for Table 8:** Products are placed in the category for which they were designed rather than for which they might be used (except FrameMaker as noted below). “Comes with the machine” indicates a software product supplied by the manufacturer of the computer (UNIX).

- <sup>1</sup> Procurement of the Word, Excel, and Powerpoint suite should be made via the Microsoft Office package. For PCs, Microsoft Office Professional also includes the Microsoft Access database application.
- <sup>2</sup> When more than one product is listed as a standard for a given computer, the list is preferentially ordered; the first item is the standard for new acquisitions.
- <sup>3</sup> Although FrameMaker is a desktop publishing application, it is used for word processing and creating presentation graphics by many UNIX users.
- <sup>4</sup> For scheduling facilities, meetings, and group activities, not necessarily for personal information management.
- <sup>5</sup> Groupware is a relatively new applications area still under active development. Organizations need to assess their own cost/benefits associated with using Groupware.

## 3.2. Software Distribution at LANL

With respect to distributing software at LANL, there are four main categories:

1. Freeware and shareware software,
2. Site-licensed software,
3. Software distributed electronically for which there is a charge, and
4. Software distributed through a JIT contract.

There are several methods of obtaining new or revised software at LANL:

- A JIT contract that may be used for purchasing individual copies of commercial software for PCs and Macintoshes.
- An ESD system for distributing Labwide site-licensed software.
- Freeware and shareware from LANL’s FTP site ([ftp.lanl.gov](ftp://ftp.lanl.gov)) as well as many other FTP software archives found on the Internet.

### 3.2.1. Freeware and Shareware Software

Freeware is software that someone has written and has distributed for free. An example of a freeware product is NCSA Mosaic, a popular Web browser. However, freeware may contain bugs, not to mention viruses.

Shareware is similar to freeware because it is distributed freely, but it’s different in that the author requests a nominal payment if you decide to use the software. The rules governing software purchases at LANL can sometimes make it difficult to purchase shareware legally, either individually or sitewide. Nevertheless, CIC will try to purchase site licenses for shareware if appropriate commercial software is not available.

### 3.2.2. Site-Licensed Software

There is a small but steadily growing list of software for which someone at LANL has purchased a site license. Because LANL is such a diverse organization and because one group can buy a site license for the entire Laboratory,

it is not easy to know about all of LANL's current site licenses. A further complication is that the Business Operations Division (BUS), Group BUS-5, must review the terms of the site license before Labwide distribution can be approved legally. Some site license agreements are for unlimited duplication with no limitations so long as the software is distributed only to LANL employees. However, other site license agreements are not so flexible. Often records must be kept of all persons at the Laboratory who have obtained site-licensed software. Sometimes the software agreement stipulates limitations as to the number of copies that can be distributed. And when it comes to paying for the software, careful records must be kept. For information about site licenses send E-mail to [license@cic.lanl.gov](mailto:license@cic.lanl.gov).

To download site-licensed software that is not shareware from <ftp.lanl.gov>, you must have an ICN user account. Log in using your Z-number as the user name and your ICN password as your password.

### 3.2.3. Registering Site-Licensed Software

To register for site-licensed software at LANL, send an E-mail message to [swlicense@lanl.gov](mailto:swlicense@lanl.gov). In the body of that message list the following: your Z-number, product name, version, quantity, and platform (optional for some software); each item must be followed by a space or a return.

Currently, the only free software that is tracked (because of site license agreement) is the Macintosh operating System 7.5 (abbreviated macros). For example, if Z-number 123456, were going to download System 7.5 software for the Mac and distribute it to six Macintosh computers in the group, you would enter the following in the body of your E-mail: 123456 macros 7.5 6.

### 3.2.4. Electronic Software Distribution (ESD)

The ESD home page contains listings of available Macintosh, PC, and UNIX software. If you are a Macintosh user, you must first obtain a decompression program called Stuffit Expander before you can download software from the ESD system. Stuffit Expander is available from the LANL FTP server (<ftp.lanl.gov>) or call 7-HELP (7-4357) for an E-mail or diskette copy.

To obtain, update, or register your copy of Netscape, JetForm, MacSLIP or Acrobat Exchange, use a Web browser (Netscape). To obtain these and other commercial software programs for which the Laboratory either holds a site license or volume purchase agreement, use ESD system.

To see a list of the software registered in your name, click on the "proof-of-registration" link on the ESD home page and enter your Z-number and either your ICN password or Smartcard PIN.

### 3.2.5. Diskette Software Distribution

While software distribution through the network is the preferred method, not everyone has the means for electronic transfers. To compensate for this, CIC-2 has a high-speed diskette duplicator. By supplying the appropriate number of diskettes to CIC-2, you can receive the desired software. In the case of Macin-

*Information by Subject/  
Electronic Software Distribution*



tosh System 7.5, whose full feature set comprises 13 high-density diskettes, you can opt to pay a nominal diskette replacement charge for the software.

### 3.2.6. Just-in-Time (JIT) Software

LANL has a JIT software contract with CJ Enterprises for PC and Macintosh software.

- To find out what software is currently on the contract, ask for prices, or request catalogs, call BUS-4 at 667-4171.
- To order the software by phone, call 667-8673.
- For information about the software packages themselves, call CIC-2 at 667-HELP (4357).
- For help with the on-line ordering system call 667-9445. The software packages will be delivered to your location.

## 3.3. Downloading/Configuring Network Software

This section shows how to get workstation networking software and identifies the critical configuration information.

### 3.3.1 OnNet/Transmission Control Protocol (TCP) Network Software

The Laboratory has a site license for OnNet/TCP Network Software. The CIC Division has implemented an on-line distribution system for IBM PCs and PC clones running DOS Version 4.3 or later. However, OnNet is not yet available through ESD. Instead, after obtaining a serial number and authentication key, contact CIC-2 Stores (7-3194) for the software. If you need help installing the software, contact CIC-2 at 7-HELP.

Each time you register a new copy, you will receive a serial number and authentication key (be sure to record these numbers). You may register as many upgrades and new copies as you like. Upgrades are free but require a valid serial number from the previous version.

### 3.3.2. Windows 95 Serial Line Internet Interface Protocol (SLIP)

#### Installation

Assuming that you already have a modem installed and configured and that you are not connected to any network (i.e. through a docking bay), there are four basic steps to the installation of SLIP/PPP support and scripting in Windows 95. The following must be done in order:

1. Install SLIP software and scripting support,
2. Configure the adapter,
3. Set up your connection, and
4. Add the script.

A complete listing of these instructions is available from the Web or by calling 7-HELP.



*Computing at LANL/Desktop Software/SLIP*

If you have the floppy disk version of Win 95, you may not have all the files you need. See the Microsoft dial-up scripting support page.

### 3.3.3. Macintosh Networking Software

Copy the contents of the following folders from VersaTerm Pro to your system folder by dragging the files into the system folder (note that the system installer may not copy all files needed for SLIP).

- System extensions (includes the files, MacTCP, LAT, VersaTerm AdminSLIP, VersaTerm ControlSLIP, VersaTermSLIP Extension)
- Connection tools (includes the file VersaTerm Telnet tool)
- File transfer tools (VersaTerm FTP and VersaTerm FTP Client tools)

(If you receive a Mac that has “Open transport,” do NOT do the following, but call CIC-2 at 7-HELP for assistance)

Next, copy MacTCP and MacTCPdnr into the system folder.

To Configure the MacTCP File refer to the Web.

To use SLIP with MacTCP, you need the following three files:

- VersaTerm AdminSLIP, which performs configuration and control of the SLIP connection,
- VersaTerm SLIP Extension, the core on which SLIP is based, and
- VersaTerm ControlSLIP, a control panel required to allocate memory of VersaTerm SLIP Extension.

How to Configure a New VersaTerm Session

1. Select “New Sessions” from the “Sessions” pull-down menu. A dialog box opens.
2. Type the session name (for example, “Register”) in the lower left of the dialog box.
3. Click the “Config” button. A new dialog box will open up.
4. Type the machine name or IP address in the Host TCP/IP address box (for example “register.lanl.gov”).
5. Click the “OK” button. The second dialog box closes, and the first dialog box reopens.
6. Click the “OK” button, and a new session icon should appear on the bottom of your terminal with the other sessions.

*Computing at LANL/CIC Groups.../  
CIC-2 Desktop Support/Electronic  
Software Distribution*



To connect to the session double-click on the session icon of your choice. Problems? Call the Customer Service Center at 5-4444 option 1.

### 3.3.4. TN 3270 for the Macintosh

TN 3270, a freeware program that emulates an IBM 3270 terminal, is useful for accessing Labwide applications. An icon is available through CIC-2 to connect directly to the IB system.

TN 3270 will run on any Macintosh with at least 500k of available RAM and 700k of available disk space. The Macintosh must have MacTCP installed and be connected to the Laboratory network via Micom, ISDN, SLIP, or Ethernet (LAN). Obtain TN 3270 from the Web.

You can obtain a copy on diskette or by E-mail by calling 7-HELP (7-4357).

*Computing at LANL/Computing  
Services.../Desktop Support/  
SLIP*



## 4. COMPUTING IN THE ICN ENVIRONMENT

While many users will have only a casual and mostly transparent relationship with the ICN, some aspects of the ICN are important for most Los Alamos computer users to understand.

### 4.1. Becoming an ICN User—Validation

Because the LANL network is accessible from the Internet, there is a need to protect it from unauthorized use and abuse. Among the several layers of protection is the use of “passwords” at the user level. By requiring the use of a password, the system can limit access and privilege to different environments and resources of the ICN.

The most common password is the “ICN password” that allows access to the computing and network resources controlled by CIC Division. Access to administrative data that may contain sensitive personnel or business operating data is protected by the use of ICN passwords and Smartcards. Personal computers, E-mail accounts and storage systems may make use of a secondary password.

ICN passwords provide the most security, with different passwords for each of the computing environments (so you could have as many as three). Additional information on the generation and security of passwords is contained in the section on security [Section 1.4]. The FY 1996 rate is \$7/month for an open, secure unclassified, or secure classified password.



***Computing At LANL/ICN Validation and Registration/Register for ICN Accounts***

### 4.2. Requesting a Password

To request a password and/or a Smartcard to access the ICN, complete and submit to the ICN Password Office an ICN Validation Request form available from

- WWW—Computing at LANL/ICN Validation and Reg/Validation Request. This is a PDF file and requires Acrobat Exchange in order to view or print. (To obtain Acrobat Exchange contact CIC-2 at 7-HELP.)
- The JetForms utility,
- The monthly CIC publication BITS,
- Group offices, or
- Call the ICN Password Office (665-1805) to have a copy faxed or mailed

The following requirements must be met before your Validation Request is processed:

- All Validation Requests must be approved by your manager, who signs the “Authorization” area (on the back).
- Access to the secure environment of the ICN requires a DOE Q-clearance or a DoD Secret (full background) clearance with RD certification and a second management approval (on the front of the form).
- Non-LANL employees are required to have a LANL contact. Your contact person must also sign the “Authorization” area.

- Non-US citizens (visitors or assignees) must attach a copy of Form 982 (Request for Unclassified Visit or Assignment by a Foreign National) with all approval signatures. Be sure Box #11 of Form 982 is completed. If you are not covered under a LANL/DOE approved Visitor Assignment Request, attach written justification from your host division director describing your need to access the ICN.
- If you require administrative access (Labwide systems such as T&E, Stores, TRI, EIS, FMIS, PAIRS, data warehouse) and are not a cleared, full-time LANL employee, contact the Lab-wide Systems Office (665-4444, option 2) and request an access authorization packet, which contains additional forms. You must also attend a Labwide systems access security briefing. Administrative users under 18 years of age should contact Lab-wide Systems (665-4444, option 2).

New ICN accounts are created immediately upon receipt of your Validation Request. For faster service, FAX or hand carry the request to the Password Office (TA-3, SM-200, Room 257; you must have either a Q or an L clearance to enter this area).

When you receive a password or Smartcard, sign the password/Smartcard receipt and return it to the Password Office via inter-office mail (MS B251) or fax (667-5304). Your password and/or Smartcard will be activated when the Password Office receives the receipt.

Please read all information included in your password packet to be informed on security issues and your responsibilities as an ICN user. There is also information on how to use "Register" for machine validations, E-mail addresses, charge code information, and Smartcard PINs.

#### 4.2.1. Use of Smartcards

You will need a Smartcard to access business systems applications on machine IA. You must have an ICN Password if you need a Smartcard.

A Smartcard is a credit-card-sized computer that generates passwords, or in Smartcard parlance, "passcodes." Like a desktop computer, it has a keyboard (the set of keys at the bottom of the card), a screen (the small display window at the top), and a microprocessor, which makes it a "Smartcard."

To use a Smartcard, you first select and register a PIN, much as you would with any bank card. Then, each time you key this PIN into your Smartcard, it generates a new, unpredictable passcode that is valid for one minute and for one log-in ONLY. The ICN authenticates the passcode based on your Smartcard serial number, your PIN, and the time. Each passcode access will generate five passcodes that will be displayed in succession, automatically. The small bars to the left of the pass code indicates the time remaining (in ten-second intervals) for the use of each passcode.

The capture of passwords, either as they travel through the network or reside in a system file, is an overriding concern in computer security. With the Internet, this risk has grown enormously. The best defense to this threat is a one-time, disposable password—no more password file to "hack" and no more permanent password to "sniff."

Smartcard quick reference cards for both Macs and PCs are available from the ICN Password Office (665-1805).

#### 4.2.2. ICN Password Renewals

ICN passwords in the open and secure environments must be changed semiannually. You can change your own password for open/administrative computing via on-line renewal—either when the password comes up for renewal or at any time beforehand (if you're concerned your password may have been compromised or "sniffed"). The Password Office will notify you by E-mail one month before your password expires.

To change your password

- Log on to the Register machine [see Section 4.3.],
- select "Change your ICN password," and follow the prompts.
- Five passwords will be displayed. Decide on the one you want, or request another set of five. When you select a password, it goes into effect immediately, and your expiration date is moved forward six months.

If you don't obtain a new password on-line within the specified time, your ICN account will be blacklisted, and when you attempt to log on, a message will be displayed indicating your password has expired. If this happens, you will need to contact the Password Office for further instructions.

#### 4.2.3. Non-LANL Users

LANL also allows non-LANL people to use the ICN. Computing services are generally available, for a fee, to other government agencies. Otherwise, you must be in collaboration with LANL employees.

If you are not a LANL employee, and you want more information about obtaining an ICN account, call the External Computing Office at (505) 665-1517 or 665-1516, or send E-mail to [external-computing@lanl.gov](mailto:external-computing@lanl.gov).

### 4.3. Registering For ICN Resources

To use specific ICN resources such as E-mail or compute servers, you must be a "registered" user. A server called "Register" provides a centralized registration function. After receiving your password or Smartcard, you can use the "register" function to do the following:

- Register, display, or remove authorization entries for various ICN compute servers. (Changes are not reflected in the display until the next day),
- Register for ICN E-mail POP service,
- Change your ICN password or set up or resynchronize your Smartcard, or
- Use the EMR [see Section 5.2.8.].

If you are unsure as to how to access "Register," here is a tip from the open and administrative networks: use Telnet to contact [register.lanl.gov](http://register.lanl.gov).

There are several methods that may be used to log on to the Register machine; all but one require the ability to perform a Telnet function. If your workstation has Telnet, proceed as follows:

- From UNIX or MS-DOS (with PC/TCP), type the command “telnet register.lanl.gov.”
- From Macintosh, using NSCA Telnet, open a new connection, type “register.lanl.gov” in the Host/Session name field, and click “OK.” You will then be prompted to log in.
- From Windows NT select “Accessories,” “telnet,” “connect,” “remote system,” and type host name “register.”
- From Windows 3.1 (need PC/TCP) click on “TNVT” (under the group “PCTCP Win Apps”), select “new,” and type “register.”
- From Netscape “LANL home page” choose Computing at LANL/ICN Validation and Registration/Register for ICN Resources

If you have the ability to log in to IA, from the IA menu select “AC.” When you log in to “register” you will see the following menu:

```
Welcome to register.lanl.gov
Enter your 6-digit ICN User Number [RETURN to exit]:
012345
Registration for '012345'
    1. Go to Name Registration
    2. Change ICN password
    3. Set Smartcard's PIN
    4. Resynchronize Smartcard
Enter option [exit]
```

Option 1 is used to perform most of the functions. The following example shows how the registration menu will appear:

```
Enter option [exit]: 1
Authenticate using password or passcode.
Password: Enter your ICN password here, it should be
print suppressed.

Welcome to the LANL Name Attribute Server.
This system replaces the old Register & EMR utilities.

It allows you to create and modify the properties of names.
Your primary name is 'abc'. You can reset your pri-
mary name by creating a new name and making it your
primary name.
Registration for 'abc'
    1. View Attributes
    2. Give 'abc' to Another User
    3. Create another Name
    4. Change to another Name
    5. Expire 'abc'
    6. Set UID
    7. Set Forwarding Address
    8. Set URL for a WWW Homepage
    9. Set Default Charge Code
    10. Register for ICN Accounts
    11. Get Vendor Software
Enter option [exit]:
```

Function	Description
1. View Attributes	Lists your computing identification information.
2. Give 'abc'...	"Give" your username to another user.

3. Create another Name	Create another username as an alias for your primary name.
4. Change to another Name	Assume the identity of a user who has "given" you his or her name.
5. Expire 'abc'	Delete your user name.
6. Set UID	Establish a UNIX user ID.
7. Set Forwarding Address	Define (or redefine) an E-mail for warding address.
8. Set URL for a WWW home page	List the address for your home page.
9. Set Default Charge Code	Used for UNICOS, passwords, and POP mail servers.
10. Register for ICN Accounts	Open Crays, Open Cluster, Beta, CCVAX, POP service.
11. Get Vendor Software	Register for OnNet: TCP/IP Software for IBM PCs and PC Clones.

#### 4.4. ICN Authentication—KERBEROS

To use some ICN resources such as the supercomputing facilities, the Common File System (CFS) or the Print And Graphics Express (PAGES) high speed printers, you must identify yourself with your Los Alamos User Number and ICN password. This process uses the Kerberos Authentication facility in which the ICN password is never passed over the network in clear text.

Kerberos verifies your identity when you try to access different ICN resources. It does so through the use of tickets. A ticket is a small encrypted file that belongs to you. The ticket allows you to perform many functions such as logging on, executing shell commands, copying files, and retrieving files. These actions can all be performed on remote hosts without the need to send the ICN password across the network.

Kerberos commands mimic most UNIX commands except that they start with a "k." For example, you can "klogin," "kcp," "krsh," etc. You must first request a kerberos ticket before using any of these features by issuing the "kinit" command. "Klist" and "kdestroy" will list and destroy all kerberos tickets respectively. (Note that "cluster" resources use the command "k4init").

Use of Kerberos involves several important points:

- Kerberos tickets expire after ten hours and may need to be renewed. Existing connections are not affected when tickets expire.
- Kerberos authentication is global, affecting all current and future sessions. If you authenticate yourself in one window, the authentication may affect all windows. If in doubt, you can always use the "klist" command to verify the active Kerberos authentication
- The k-commands are used from your workstation to UNICOS. They do not work from UNICOS to your workstation or between local workstations.

Once you access a resource (such as UNICOS) with a kerberos command such as "klogin" and you are "authenticated," there is no functional difference between

that command and the standard Unix R command. The K commands transparently authenticate and are considered more secure than standard R commands.

## 4.5. Charging Policy For ICN Use

Many organizations at LANL charge for the use of services to support the cost of providing the service. Some of the services available from the ICN are recharged to the using groups:

- UNICOS and Cluster CPU time, I/O and memory use (dependent on the specific system used);
- ICN dial-up communications (including 800 service);
- CFS service charges (dependent on file storage activity and output device); and
- PAGES charges (dependent on output activity and output device).

The rates are listed on the Web.

The ICN resource charges you accumulate are assigned to the charge code number entered during the log-on sequence or the default code in the Account Control System (ACS). This charge code represents the first four characters of the cost center and the first four characters of the program code. Example: 8j09W123. The cost center usually relates to your group while the program code is the specific project worked on.

Your ICN charges for a given period can be displayed by accessing the Web.

### Changing Charge Codes

The primary means of changing a charge code is through the Register facility. From the main menu select Option 1, E-mail and CIC service registration. Then select Option 2, user information. Then select Option 2, default charges code. This will affect the billing for UNICOS, the Cluster, POP servers, and ICN passwords and Smartcards. However, it will not affect other resources that are changed individually. Information on how to change various charge codes is available on the Web.

## 4.6. ICN Account Control System (ACS)

The ACS provides account control for components of the ICN for both internal (Laboratory) and external users. The ACS is available from the UNICOS machines and provides for the following:

- validation of user charges,
- definition and validation of charge codes,
- prevention of overcharging, and
- prevention of charging beyond an expiration date.

When a charge code fails to work, contact your business team leader for your division or group. A list (although often out of date) is found on the Web.

A better suggestion may be to simply ask your group office who the business team leader is.

*Computing at LANL/Computing  
Services and Resources/Charge  
Rates for CCF services*



*Computing at LANL/Network  
Services and Resources/Net-  
work Services Information/Net-  
work Recharge/ (Search for  
Network Groups)*



*Computing At LANL/ Wel-  
come.../Changing Charge Codes*



*Information by Organization/  
Business Operations  
Division/Services/BUS-9  
Business Support  
Services/Financial Reporting  
and Analysis*



## 5. COMMON COMPUTING RESOURCES AND SERVICES

### 5.1. Logging-in to Remote Computers

Remote log-ins allow you to log in to another computer from your local workstation (lhost), executing programs and accessing services as though you were sitting at that remote computer (rhost). (Networked computers are often referred to as “hosts” in much of the supporting documentation). The log-on process may differ depending on the type of workstation being used and the method of connection. The following is a description of some of the log-on methods currently available: TCP/IP connections using Telnet, “rlogin” or “klogin,” and dial-up /ISDN type connections using terminal emulators (such as VersaTerm).

#### 5.1.1. Telnet Log-on

Use Telnet to log on directly to TCP/IP hosts such as UNICOS machine Rho:

```
telnet [rhost]
```

where rhost is the remote host name. [Refer to Section 4.3 to see how Telnet works with different types of workstations.]

```
% telnet rho
Trying 128.165.220.1...
Connected to rho.lanl.gov.
Escape character is '^]'.

Cray UNICOS (rho) (ttyp007)

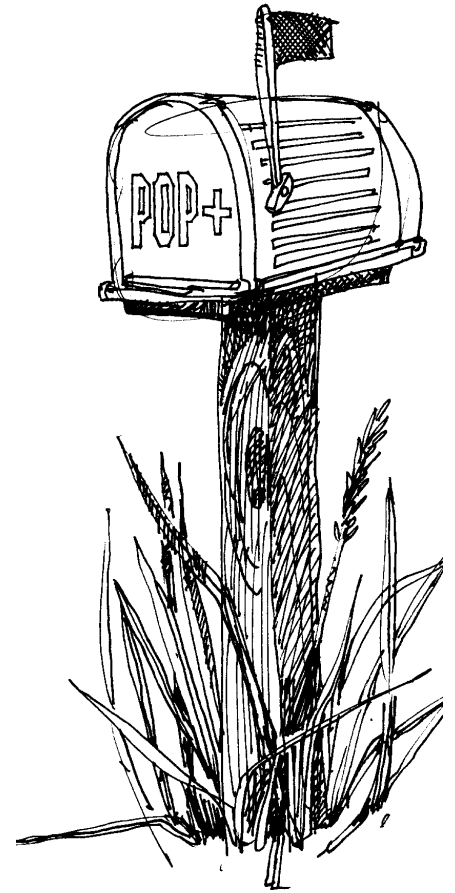
login: abc
ICN Password or Passcode [012345]: (echo suppressed)
Last successful login was : Wed Feb. 28 12:46:47
from abc.lanl.gov
followed by 1 failed attempts
LANL ACCOUNT = 7c04wr43
Logon Compartment = NULL

rho%
```

If the Telnet command is used without arguments (or fails to make the desired connection), it enters the command mode, shown by the prompt <TELNET>. Enter QUIT, <CTRL-c>, or <CTRL-z> (VMS only) to exit Telnet.

#### 5.1.2. Integrated Services Digital Network (ISDN)

ISDN allows you to make simultaneous voice and data calls on the same telephone line; you no longer have to have a separate “port” or a modem in an office. ISDN allows your workstation to be connected into the ICN through the TIG. While this provides most of the basic networking functionality of a LAN connection, ISDN has a relatively slow “data rate.” This means that some applications will take a longer time to display. If your site has ISDN service, CIC-4 can provide the appropriate connections to your workstation.



After ISDN is installed, your workstation will be ready to accept a “dial-up” command from the VT100/VT220 type of terminal emulator window. After opening the selected emulator window enter a <RETURN>. You will then be prompted for a command:

CMD:

Enter the “dial” command followed by the appropriate phone number:

53347 for the Los Alamos Integrated Communications  
System (LAICS) basic service, or  
53444 for LAICS enhanced service.

The workstation display will present the following activity:

```
CALLING 53347
Type E to end call:
CONNECT
DATA MODE

UNAUTHORIZED ACCESS IS PROHIBITED
Los Alamos National Laboratory (tig-isdn-x) Login as
"help" for assistance User Access Verification
Username:
(Enter your User number and ICN password to receive
the TIG prompt:)
Username:012345
Password:(password input is print suppressed)
tig-isdn-2>
```

You will be connected to the TIG and can now enter the name of the desired host for a regular Telnet log-in.

After completing a log-in session and logging off the remote host, close the ISDN connection by entering “ex.”

### 5.1.3. Port Selector Log-in—Micom

Port selectors provide access to the ICN/Internet typically through hardwired lines and modems at relatively low speeds (9600 baud). Your workstation is assumed to be communicating through an emulator such as VersaTerm. Windowing applications such as PCInform and SLInform may be configured to present the connectivity in terms of icons (symbols that represent the action desired). The resources these icons are pointing to are defined in a configuration menu.

Port selectors are rapidly being replaced by ISDN service, which provides higher speeds and more flexible connectivity.

Begin the log-on process through a port selector by entering a <RETURN>; you will receive a message similar to the following:

```
<CONNECTED TO CHANNEL 86-01/012>
Los Alamos Integrated Computing Network
PORT 86-10/012 ENTER OPTION:
(enter a RETURN to see options)
```

The channel that you are connected to will vary as will the subsequent menu that is displayed. “OPEN Port Selectors” will display a menu similar to the following:

```
UNAUTHORIZED ACCESS IS PROHIBITED
Los Alamos Integrated Computing Network
PORT 86-10/012 ENTER OPTION:
Available Systems are:
CC      CCVAX, DP Open
LIS     Laboratory Information Services (job ads,...)
CANYon  LANL ALL-IN-1 Mail System
TIG     Terminal Internet Gateway
EXIT    Exit System
PORT 87-06/018 ENTER OPTION:
```

Enter the appropriate resource desired and complete the log-on with the information requested by the prompts.

#### 5.1.4. Terminal Internet Gateway (TIG)

The TIG permits access to Internet hosts from terminals via the following:

- Dial-up (505) 667-9020/9025 or (800) 443-1461,
- ISDN,
- Port Selector (Micom), and
- Telnet.

To use the 800 dial-in number, you must establish a default charge code using the Register facility.

To enter the TIG via Micom enter “tig” at the “Enter Option” prompt and respond to the log-in prompts as follows:

```
Username:(Enter your user ID or user number)
Password:(Enter your ICN password in lower case)
TIG>
```

To log in via dial-up, select an appropriate number and respond to the prompts as shown above. There is a charge for “connect time,” even on the 800 number.

At the “tig>” prompt, you can make connections to a host by simply entering the name of the host or enter commands to the TIG. When finished using the TIG, log off the host, then log off the TIG with “EXIT.” The TIG terminates any connection after 30 minutes of inactivity or at the exit command.

#### 5.1.5. Remote Log-in—Klogin

“Klogin” uses a Kerberos authentication server to verify your password submitted with a “kinit” command and is used on most servers. Therefore, when you use “klogin,” there is no request for a password.

#### 5.1.6. SLIP into ICN

SLIP allows you to sign onto the ICN from a telephone line (with a modem) and proceed as if you were on LAN connection. You can then send files via FTP, connect via Telnet to a variety of remote hosts, and use the mail tool

Eudora. Before attempting to use SLIP, you must configure either MacSLIP or AdminSLIP. Call CIC-2 (7-HELP) for assistance

To use SLIP, you need a telephone line, a Mac or PC with a modem (1200 to 14400 baud rate), and VersaTerm Pro 3.6.2.1 or above (this version includes SLIP software) or OnNet or PC/TCP.

To use SLIP from a Mac, proceed as follows:

1. Run VersaTerm AdminSLIP.
2. Click "Connect."
3. Enter your ICN user number and password when prompted.
4. Everything is automated. Do not type in the "Status" box. This box shows you what is automatically happening, such as getting your IP address.
5. To disconnect, click "Disconnect" in the VersaTerm AdminSLIP application.

To check to see if the SLIP connection is active to the ICN, select "control panel" and look at VersaTerm controlSLIP for the following message by the "Status:" prompt:

SLIP is active and connected.

If you need help using SLIP from a PC, call 5-4444, option 1.

### 5.1.7. Blacklisting Messages

During the log-on process, if you enter your password incorrectly and press <RETURN>, your log-on will not be accepted, and you will see the following message:

"password incorrect" or "login incorrect"

If this occurs ten successive times within 5 minutes, or if you "successfully" log in 10 times within 5 minutes, your user number is blacklisted by the ICN. A successful log-on resets the invalid password counter to zero.

If you attempt to log on after seeing the above message, the log-on will be rejected by the ICN, and you will see the following message:

"permission denied"

If you become blacklisted, call the ICN Password Office at (505) 665-1805.

### 5.1.8. Breaking a Hung Log-in Session

It is often difficult to know just where or why your computer screen might freeze. Is it the application? The host computer? The network? Your own desktop? Sometimes the cause is one of these, but often it's a combination. Whatever the problem, it has brought your ability to use your computer to a frustrating halt. Often your main concern isn't determining what went wrong; rather, you want to know how to get out of your current unproductive predicament.

If the appropriate break sequences don't revive your computer/terminal, you may need to reboot your system or kill the window that's locked. Machinery

that freezes often and consistently probably needs troubleshooting. Ask your local system administrator for help in determining the cause, or call any of the CIC support centers.



*Computing at LANL/Network Services/ Breaking connections*

## 5.2. Electronic Mail (E-mail)

### 5.2.1. Concepts & Etiquette

Use E-mail to exchange information with other users over networks such as the Internet or Bitnet (open partition only). Although E-mail appears instantaneous,

- messages may not be immediately posted to a recipient,
- the recipient may not be logged on to the system, or
- the recipient may be busy with other tasks.

To use the E-mail system effectively, choose your words carefully and

- Log on at least once each day and read your mail,
- Compose single-subject messages whenever possible,
- Define an appropriate “subject” line—avoid using “FYI”!
- Assume that any message you send will live on indefinitely,
- Know who your intended audience is and establish an appropriate level of formality,
- Keep the list of recipients and CC:s to a minimum,
- Identify yourself and your affiliations clearly, and
- Know when NOT to use E-mail; consider face-to-face, phone, or paper.

Most E-mail systems communicate using (a text-only character format) character sets. If you have a file that either contains binary data or is formatted in some other manner such as Microsoft Word, you may have to prepare the file using conversion utilities such as UUencode or Binhex. Some mail readers (such as All-In-1) cannot process these types of files. Avoid sending anything but ASCII files unless you know that your recipient can handle them.

Insert carriage returns every 60 characters or so. Don’t depend on your terminal hardware carriage return to generate new lines—it probably doesn’t.

### 5.2.2. Functionality

The following functions are available in most E-mail systems:

- Receive and read mail;
- Create and reply to mail;
- Save, delete, or hold incoming mail;
- Establish distribution lists;
- Forward E-mail to others;
- Assume an alias (log in as a guest) to another account;
- Provide travel/vacation advisement; and
- Find E-mail addresses.

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Mail/Introduction to E-mail/For-  
warding E-mail*



### 5.2.3. Forwarding E-mail

All supported mail services allow mail to be forwarded to another address. You may have several systems on which you can receive mail but one that you prefer to read and log your mail. You can establish a forwarding flag on each of the systems on which you do not want to read mail.

### 5.2.4. Sending Attachments—Document Conversion

E-mail attachments allow people to easily share formatted files such as graphics, spreadsheets, and documents across different platforms and across the globe more easily than ever before. However there are problems associated with such transfers.

E-mail travels in ASCII format. When you need to send a formatted document, such as Word, it must be encoded. There are three main encoding schemes: UUencode, Binhex, and Mime.

When you attach a file to an E-mail message, the encoding scheme in your mail program converts the file to ASCII format. When your E-mail arrives at its destination, the mail package on the other end has to convert your attachment back into the original format.

If your mail package is using UUencode, and you send something to someone whose mail only talks Mime, the attachment will not get converted back into ASCII format. The recipient will see only a bunch of garbage stuck to the end of your E-mail message.

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Mail/Introduction to E-mail/E-mail  
Document Conversion*



A complete description of what facilities are available for sending attachments is on the Web along with suggested notes of etiquette.

### 5.2.5. Choosing an E-mail Service

There are several different E-mail services supported at Los Alamos. The choice is usually dependent on the type of workstation you use, the network connectivity available, and the E-mail interaction you have with your working group.

For many users the choice is simply one of personal preference. All of the supported systems can E-mail to each other and to Internet addresses outside the Lab. The following descriptions may help you decide which is best for you.

### 5.2.6. UNIX Simple Mail Transfer Protocol (SMTP)

Virtually all UNIX-based systems will have a mail facility that uses the command implementation “mail” (a primitive interface). While this is not particularly user-friendly, other interfaces are usually available as follows:

- Workstations such as the Sun have a mail tool facility that allows the use of a mouse for point-and-click operations. Coupled with a good screen editor such as Textedit, this is a very powerful and easy-to-use mail system.
- “Pine” is a menu-based interface that is generally available and is a definite improvement over using the standard UNIX mail interface. It is also useful if you have a Eudora account but only dial-up access without SLIP.

UNIX mail is a standard facility available on all UNIX platforms (Sun, SGI, etc.)

### 5.2.7. Eudora (POP Mail Service)

Eudora is a Mac or PC windows application that employs icons and point-and-click operations. It communicates with an SMTP (UNIX) server to download your mail from a POP server to your Eudora client. Both LAN and dial-up connections (using SLIP) may be used to connect to the POP server where your mail is stored until you call for it. A local Eudora password is used that can be changed by you. A complete set of instructions for using Eudora is on the Web.



[http://www.yahoo.com/Computers\\_and\\_Internet/Software/Electronic\\_mail/Eudora](http://www.yahoo.com/Computers_and_Internet/Software/Electronic_mail/Eudora)

Considered easy to use, there are several different POP servers as follows that provide varying levels of additional features:

- ICN Internet user accounts (such as “POBOX1663”) provide minimal POP service without the need for an ICN password. The ICN password permits you to log on to the POP server directly to access your mail account and to use FTP and CFS for file manipulation.
- “Beta” is a full-service compute server in addition to its POP mail service.
- Local POP servers may be established by other LANL organizations with similar capabilities.

To use Eudora you must install the client software for your Mac or PC. It is available from CIC-2 or can be purchased from the JIT vendor. The software must be configured to communicate to a selected POP server (or servers).

You must also arrange for a POP server account. ICN POP accounts are available through the Register facility or by calling the Customer Service Center (5-4444, option 1).

Eudora is on the Laboratory’s JIT software contract or available through the ESD on Netscape. The order number for the Mac version is CJE510107, and the Windows version is CJE110081. Both versions cost about \$60.00. These commercial versions have a number of added features not found on the free-ware version, and they come with a manual and free technical support from the vendor, Qualcomm. (The freeware version of Eudora is not recommended.)

Eudora uses a special password (not your ICN password) that is defined at the time your account is established. It can be changed from the Register machine or from within Eudora itself. If you use the Beta Machine as a POP server, you must set the password with the “passwd” command.

#### Vacation Message

Because E-mail can be a critical part of our daily business, when you leave for vacation or travel it is important to let others know that you are not reading your mail. A vacation program is available. Connect via Telnet to the POP server and enter the command “vacation.” A series of prompts will move you through the program. When you return from travel, log on and again enter “vacation.”

“Vacation” will reply only to messages addressed directly to you—and then only if it hasn’t previously replied to the sender during the previous week or so.

#### Using Pine on the POP Server

When you don’t have access to a workstation that has Eudora, or you can’t make an appropriate network connection (SLIP), you can still read your mail if

you can access the TIG and then connect via Telnet or “klogin” to the POP server.

Example: `tig> telnet pobox1663`

Log in to the server using your ICN User Number and ICN Password. At the machine prompt (a % sign) enter the following command to identify the type of emulator you are using (typically a vt220):

`setenv TERM vt220`

Next, enter the command “pine.” You will be presented with a series of menus that will permit you to access virtually all of the mail functions.

### Configuring Eudora

To use Eudora, you must be sure that it is properly configured. PC Eudora (version 2.0 and above).

- Select “Tools” from the menu bar.
- Select “Options.”
- From the “Getting Started” category, enter your POP Account address such as `u01234@pobox1663.lanl.gov`.
- From the “Personal Information” category, enter your “Return Address” such as `joe@lanl.gov`.
- Set the “Checking Mail” category to 15 minutes.

PC Eudora (Versions 1.4.3. to 2.0)

- Select “Special” from menu bar.
- Select “Configuration.”
- Enter your “POP Account address” such as `u01234@pobox1663.lanl.gov`.
- Enter your “SMTP Server” such as `mailhost@lanl.gov`.
- Set the “Check(s) for Mail” category to 15 minutes.

Mac Eudora

- Select “Special” from Menu bar.
- Select “Settings.”
- From the “Getting Started” category, enter your POP Account address such as `u01234@pobox1663.lanl.gov`.
- From the “Personal Information” category, enter your “Return Address” such as `joe@lanl.gov`.
- Set the “Checking Mail” category to 15 minutes.

Netscape

- Select “Options” from the menu bar.
- Select “Mail & News Preferences.”
- Select “Servers.”
- Click on “POP3” to activate POP service.
- Enter the “server” line to read `mailhost.lanl.gov`.
- Set “Check for Mail” to 15 minutes or higher.

### 5.2.8. Electronic Mail Registry (EMR)

The EMR system is available to all Laboratory employees, contractors, and affiliates at no charge. EMR allows you to register an E-mail address in the form “user@lanl.gov.” Thus, others can send E-mail to you (@lanl.gov) without having to know specifically where you receive mail. For example: fred@lanl.gov may actually be flintstone\_frederick@bedrock.lanl.gov. If your actual mail address changes, you need change only the registration—there is no need to notify others of such changes. These addresses may only be in the lanl.gov domain.



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Mail/Electronic Mail Delivery*

When you are registered in the EMR, others can use the Finger or Ph utilities to find your E-mail address in the electronic phone book.

Regardless of which E-mail service you use, register your address with the EMR. To use EMR you must first log on to the Register server [see Section 4.3] and select option 1 (type 1 after “Enter Option [exit]:”) from the menu as follows:

```
Registration for 012345
  1. Go to E-mail and CIC service registration
  2. Change your ICN password
  3. Set your Smartcard's PIN
  4. Resynchronize your Smartcard
Enter option [exit]:
```

You will be asked for your ICN password, and a new menu will appear from which you will select Option 3, E-mail as follows:

```
Registration for 012345
  1. View Profile
  2. ICN Compute Servers
  3. E-mail
  4. User Information (UNIX names and ACS charge codes)
  5. Get Vendor Software (Old Register Menu)
Enter option [exit]:
```

When you select option 3, the electronic mail address will then present your existing E-mail address and the various E-mail registration options as follows:

```
Welcome: Casey, Albert B. <- of -> BUS-19
Your E-mail name is: casey
Your mail will be forwarded to:
casey_albert_b@ofvax.lanl.gov
Therefore, mail sent to casey@lanl.gov will be
delivered to casey_albert_b@ofvax.lanl.gov

LANL E-MAIL REGISTRATION
1:CREATE or CHANGE your E-mail name and Forwarding Address.
2:LIST EMR entries you own.
3:NEW-add an alias or create a list pointer entry.
4:DELETE an EMR entry.
5:HELP.
6:QUIT.
```

If you do not have an ICN password or would rather not contend with this process, send E-mail to consult@lanl.gov with your request.

An important feature of EMR is the Electronic Mail Address Directory (EMAD). EMAD is a collection of access information about people associated with the Laboratory. Currently, EMAD contains information from the EIS as well as information about Laboratory computer users who are external to, or affiliates of the Laboratory. Personal information includes such items as Z-number, name, telephone number, group, fax number, and pager number.

### Selecting an E-mail Name

An E-mail name can be something like abc, jsmith, or esalazar3, or martinez\_john\_a, or david.adams. The E-mail name must be unique.

### Forwarding Addresses

The forwarding address is where mail, sent to your address @lanl.gov, will really be sent by the central LANL mail server. It will generally look like

username@machine.lanl.gov  
such as

u012345@pobox1663.lanl.gov (a typical POP server mail address)

When Albert Casey registers abc as his E-mail name and u012345@pobox1663.lanl.gov as his forwarding address, he creates an E-mail address of abc@lanl.gov, which forwards mail to his account on pobox1663.

An EMR entry can also be used to shorten or simplify an E-mail address.

### Alias Names and Lists

You may register alias names and distribution lists on the EMR. Alias names are other E-mail names by which you may receive mail electronically.

## 5.2.9. How to Change Personal Information in EMR

The personal information in the registration system is taken from the EIS once a day, and some changes in EMR can be made only through the EIS. Individuals requiring changes in their personal information should contact the person designated by the group leader as responsible for the group EIS entries (usually your group secretary).

### 5.2.10. Finding E-mail Addresses

When attempting to send mail, you may not know the E-mail address of the intended recipient. To find basic information about a user, you can use one of the following tools: Finger on UNIX, Ph and Finger on Eudora, and Mosaic or Netscape.

#### Using Finger

If you have access to the Finger command on your system, you can use it to access the phone book to search local and most remote sites for users who satisfy a variety of criteria, as follows:

```
% finger casey@lanl.gov
```

```
012345 Casey Albert B. CIC-6 B251 505-667-7298
```

```
abc@lanl.gov
080330 Casey Hugh MST-6 G770 505-665-4719
hcasey@lanl.gov
113162 Casey Nancy N.CIC-3 B265 505-667-7028
114413 Olson Casey D.BUS-1 C121 505-667-1212
```



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This command lists all records that begin with “casey,” including people with “casey” as first name, last name, or any name that starts with these letters. Note that two of those on the example do not have registered E-mail addresses.



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Mail/Finding E-mail Address/  
Finger*

More information is available from the “long listing” using the “-l option” as follows:

```
% finger -l casey@lanl.gov

name:albert b. casey
account name(s):abc, 012345
office phone:505-667-7298
fax:505-667-5304
pager:
e-mail:abc@lanl.gov
forwarding addr:>abc@wrangler.lanl.gov
```

To qualify the search, you can use the first name and encase the string in quotes.

```
finger "jose martinez"@lanl.gov
```

Additional information is available by entering `finger "help@lanl.gov."`

### Using the Eudora PH/Finger Client

Some systems, like the Eudora mail package, contain a Ph program. Note that instead of returning a single line of information, the Ph program always gives you a paragraph of information for each person.

### Using Web Phone Book

The Web Phone Book application is available from the LANL Home Page. Two options are available, a short query form and a more comprehensive query form.

## 5.2.11. Distribution Lists

Two applications are available to establish E-mail distribution lists.

- Listmanager—permits you to create and maintain your own distribution list on the Lab mail host. These lists are “public,” which means anyone on the Internet can mail to them. Listmanager is fully integrated with the Laboratory’s EMR system.
- JIT-list—permits you to distribute E-mail based on demographic characteristics found in the EIS. For example, users could send E-mail to all the people in a particular Laboratory building or group. This application also allows users to send E-mail to people not registered in the EMR system. This is accomplished by directing E-mail to a print gateway that routes a paper copy through the interoffice mail system.



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Mail/Distribution lists*

### 5.3. Hard Copy Output—Print and Graphics Express Station (PAGES)

PAGES provides a variety of printing services available through electronic access via the ICN. You can order any PAGES print service without leaving your office if you have a computer connected to the ICN and the proper PAGES access tools. These tools are now available for Macs and PCs as well as UNIX machines.

In most cases PAGES can complete your print job the same day or even within hours. Print jobs can be delivered to your mail stop or distributed to on-site locations per your instructions. Your documents are available for pick-up in Technical Area 3, in the concourse of Building 132, the CCF. With PAGES, you can print to a variety of media including the following:

- 35 mm color film (slides),
- 36" color plotter,
- 8.5" x 11" black and white paper,
- 8.5" x 11" color paper or transparency,
- 8.5" x 11" color photo or transparency,
- video (VHS, 8 mm, or U-matic) (Mac & Windows interface is under development), and
- 105 mm microfiche.

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#### 5.3.1. UNIX/DOS/VMS Output—PPAGES

The command "PPAGES" sends a variety of file formats such as ASCII text or PostScript to the PAGES output facility for printing on paper, transparencies, or micro-fiche. PPAGES uses the command "LPR" (line print request) to transfer print jobs to PAGES. Most of the LPR, "LPQ" (line-printer queue), and "LPRM" (line printer/remove files) features are available, but they apply only to print jobs being transferred to PAGES. After a job is accepted by PAGES, call the CCF dispatcher for its status (7-4584).

The PPAGES command requires the specification of the file type and format. Numerous other options are available (see the "man" page).

```
ppages -ft value -format fmt filename
```

If you do not list any options, PPAGES will assign default values for the format you entered.

PPAGES uses the Kerberos authentication process to validate your print request. You must use the KINIT command prior to attempting to send output to PAGES.

PPAGES needs your Z-number and ICN charge codes before the job can proceed. It passes the values of the "environment variables" called "ICNZ" and "ICNCHARGE" to PAGES for accounting and to look up the user's delivery destination. Thus, you must have a valid charge code established.

### 5.3.2. Macintosh Output—PAGES and MacPPAGES

If you are a Macintosh user, there are two ways to print to PAGES. You can use PPAGES for Macintosh (the “normal” way) or MacPPAGES. PPAGES for Macintosh creates and ships files to PAGES in a single-step process. This is generally preferable; however, you must have AppleTalk capabilities to use PAGES with the “native” Macintosh operating system.

To determine if you have a direct AppleTalk connection to PAGES open the chooser and verify the AppleTalk zone list for a zone entitled “PAGES.” If the “PAGES” zone appears, you have a direct AppleTalk connection to PAGES services. Otherwise your Mac is not connected to a network, or AppleTalk is not routed from your network to PAGES. Contact your local system administrator who may be able to install the PAGES zone.

Assuming you have network access, you must install LaserWriter 8 (you probably already have it) and a set of PostScript printer description (PPD) files for the PAGES devices. These are available on-line in the form of an installer program.

If the “PAGES” zone is not available, you must use MacPPAGES. MacPPAGES is a Macintosh file shipper that manages a variety of formats. Unlike native Macintosh operating system programs, MacPPAGES uses a two-step process to print to PAGES. First select or create a postscript file, then ship that file to PAGES using MacPPAGES.

### 5.3.3. Microsoft Windows Output—PPAGES

For Microsoft Windows, the best methods for accessing PAGES services are listed below in descending order.

- Use the Adobe PPD, version 2.1 or later. (Like the native Macintosh operating system graphical user interface (GUI), this driver can create and ship files in a one-step process. For detailed instructions on downloading and installing, refer to the documentation in HTML or PDF 1.1MB format.)
- Use PPAGES for DOS.
- Use LPR for DOS.

The second and third methods are command-line interfaces.

### 5.3.4. MS Windows Requirements

To use PAGES from your Windows PC, your PC must be on the open network with OnNet/TCP (formerly PC/TCP) installed. You will have to install Adobe's PostScript printer driver for Windows and set up the PAGES devices as network printers. An archive file is available on-line.

### 5.3.5. Calcomp Printing Services

For large-scale printing, PAGES provides computer-generated monochrome and color drawings via a Calcomp 5835XP electrostatic plotter. This plotter can produce drawings in sizes A through E (8.5" x 11" through 36" x 88") and is capable of creating half-tone or screened color images at 400 dot-per-inch resolution using a 256-color palette and a special dielectric coating. Calcomp

allows you to create large color posters, flow charts, electrical/mechanical drawings, and other types of large scale drawing applications.

### 5.3.6. Novajet III Printing

This plotter is also capable of producing A- through E-sized color drawings on roll-fed bond paper or mylar material. The advantage of Novajet is that it provides extremely high-quality monochrome drawings via continuous-tone, or unscreened, images. The Novajet III is about four times faster than the current Calcomp plotter so turnaround time will be vastly improved. The biggest improvement, however, is in quality.

### 5.3.7. PAGES Job Status Reporting

A Web interface is now available for querying the status of jobs sent to PAGES. This service allows you to see what jobs you have in the queue, when they were printed, what options were requested, etc. You can query by Z-number, job number, or PAGES queue name. This new service can now be accessed on the Web.

*Computing at LANL/CIC Groups.../  
CIC-17 Media/PAGES/Check on  
Job Status*



## 5.4. Transferring and Storing Files

Several methods are available to transfer files between computers and file storage. This section will briefly describe the following:

- FTP—Transfer files between Internet hosts,
- CFS—Transfer files to permanent storage,
- NFS—Share files between hosts, and
- ADSM—File backup facility.

### 5.4.1. File Transport Protocol (FTP)

The FTP facility copies files between IP hosts and offers many options including the ability to delete files, list directories, and change directories on the remote machine. To retrieve a specific file you need the following:

- the name of the remote host (computer),
- an account on that computer (userid and password), and
- the path name to the file.

The general form of the UNIX command is

```
ftp remote_hostname
```

PCs may use the OnNet (PC/TCP) while Macs will use Fetch and VersaTermFTP.

When the connection is ready to accept FTP commands, the prompt "ftp >" appears.

### Anonymous FTP

Anonymous FTP allows limited access rights to information by users who do not have regular accounts on the remote host by using a special account called "anonymous." The only operations allowed are logging-in using FTP, listing the

contents of a limited set of directories, and retrieving files. Anonymous users are not usually allowed to transfer files to the remote site.

Anonymous accounts typically use “anonymous” as the log-in name and the password “guest” or your E-mail address (if it is requested by the log-in prompt).

### 5.4.2. Using the Common File System (CFS)

The CFS is used to store files on a permanent basis. CFS is available from all computing partitions and from workstations that have the ICN software installed. It can be run as a “one-line” command or interactively by simply inputting the command “cfs.” The three following utilities allow you to work with CFS from UNICOS:

- The CFS Interface utility (accessed from ICN resources),
- The Advanced CFS Interface (ACFS), and
- The CFS gateway access (CFSGW) (accessed via FTP).

CFS has a wide variety of commands and options; the following table is a summary of those more commonly used. Note that before saving any files on CFS, you must create a root directory.

**Table 9. BASIC CFS Commands**

Function	Typical Command
Create root directory with user number as name.	<b>cfs create</b>
Create named root directory	<b>cfs create/named root</b>
Overwrite a CFS file	<b>cfs replace filename</b>
Save a new file or overwrite an existing file	<b>cfs store filename</b>
Save a new file to another root	<b>cfs save /named root/file</b>
Retrieve files	<b>cfs get filename</b>
Delete files from CFS	<b>cfs delete filename</b>
Turn off delayed delete (24 hours)	<b>cfs delete delay=off filename</b>
Recover deleted files marked as “dying”	<b>cfs rescue filename</b>
List CFS files and subdirectories	<b>cfs list</b>

### ACFS

ACFS provides additional “wildcarding” capability, sorting of LIST output, recursive commands (MASSACRE), preprocessing of files before storing, automatic decompression, using the “NTEXT” command, and other processing using the “GET” command.

### CFSGW

The CFSGW allows you to access and manage your files and directories on CFS by using TCP/IP. The host name of the CFSGW is cfsgw.lanl.gov. The log-on is the basis of authentication, and no further authentication is required. Use of CFSGW from a workstation in the secure partition requires a valid Kerberos ticket.

From a UNIX or VMS platform type “ftp cfs gw” and then your log-in moniker (Z-number, Z-number prefaced with a U, user’s initials, first name, last name, or combination thereof, depending on the system) and ICN password when prompted. You will (normally) be put directly into your default CFS directory (usually /Z#, i.e., /123456). Then you can use “cd,” or change directories to whatever directory you wish.

Graphical FTP clients, such as Fetch (Macintosh) can be used to connect via FTP to the CFS. Point the client to the cfs gw with your moniker and ICN password. As when you use the standard FTP, you will be placed into your default directory. There is one major exception with this method of accessing CFS. To reference a directory other than your default CFS directory, you cannot use the normal graphical user interface, point-and-click means. Most graphical FTP clients have a menu option that allows them to change directories; at that option you can type the path to the desired directory.

If that does not work, look for an option that will allow you to issue a typed FTP command. There you enter in the command “d = /path” where /path is the full path to the directory (or to the parent directory so that the graphical nature of the ftp client can take over). Now, many graphical FTP clients (for example, Fetch 3.0+ and Anarchie) remember all of the directories that you have visited at a particular FTP site so you can still “point and click” your way around the CFS.

#### 5.4.3. Network File Service (NFS)

The NFS servers offer a storage capability for workstations, desktop computers, supercomputers, and all other computing platforms around the Laboratory. The NFS servers provide a remote UNIX “filesystem” that looks and acts like a local file system. Projects large and small can utilize this service to provide centrally located files that are available to remotely located desktop computers, workstations, and ICN compute servers (i.e., Crays, Cluster, and Connection Machines).

NFS can reduce disk purchases and your project’s file system administration and set-up problems involving file sharing across multiple computing architectures.

The NFS service includes the following:

- Daily backups of your data to ADSM in the open or secure environments,
- 24-hour help via pager (to an NFS system administrator) 7 days a week,
- Access for your questions or problems or suggestions through E-mail,
- Economy (\$35 per gigabyte (Gbyte) per month—with unlimited access),
- Server access via fast fiber-optic connections to the LANL “backbone,”
- Server power connected to an uninterrupted power supply,
- Server location in a secured and controlled-area access computer room (CCF), and
- Files up to 2 Gbytes.

#### 5.4.4. ADSTAR Distributed Storage Manager (ADSM)

ADSM is a client/server software product that provides full and selective backup and archival services for client machines such as PCs, Macs, many UNIX-type machines, and NFS file servers. ADSM can back up the client machine automatically according to a schedule requested by the user, or the client can be backed up manually by the user at any time. Initially, ADSM does a full backup of a workstation; thereafter, it copies only those files that have changed since the last backup. A “restore” of a backup at the “file” level can be done at any time, and all file attributes (permissions, etc.) are restored.

To use ADSM, you must first register your workstation with the ADSM server on the Web.

To complete registration, you must have your machine’s network node name, your cost code and program code, and your Z-number. You will also be asked to set your own ADSM password for access, to choose one of four automatic backup schedules (6 p.m. to 6 a.m. is the default), to choose when or if you want to be notified that an automatic backup has failed, and to choose who (if not you) should be notified if it has failed. You can also register by E-mail if you provide the necessary information to [adsm\\_help@lanl.gov](mailto:adsm_help@lanl.gov).

There is a one-time registration fee to pay for the software license from IBM; a monthly service charge, which covers unlimited backups; and a monthly storage fee.



*Computing at LANL/CIC  
Groups.../CIC-11 Storage Sys-  
tems/ADSM*

### 5.5. Network Information Resources

There is a wide variety of information resources available from the ICN and its connection into the Internet. This section will review the WWW [see Section 1.2], research libraries, and network news facilities.

#### 5.5.1. Research Library Home Page

The Research Library’s home page provides a link to general information about the Research Library including its collections, services, and publications, as well as links to other resources. Some of these resources are the Library’s On-line Catalog, which is used for locating books and journal titles in the collection; subject resources for locating Internet information on physics, chemistry, biology/genetics, business, etc.; and Los Alamos publications including LA reports, Dateline Los Alamos, LA Science, and Research Highlights.



*<http://lib-www.lanl.gov>*

Major effort has gone into the Subject Resources page. Librarians in the Research Library have responsibility for selecting appropriate Internet resources (such as the “Table of the Nuclides” and “Standard Atmosphere Computation”) in their assigned subject areas.

#### 5.5.2. Library Without Walls (LWW) Project

Several efforts within the LWW project are currently in progress. First is the on-line electronic document effort, which has a goal of capturing and displaying all Los Alamos report files in electronic form. The viewer for these report files is

*Research Library/*



Adobe Acrobat, which creates files in PDF. Adobe Acrobat will run cross-platform on IBM DOS or Windows, Macintosh, and Sun SPARC UNIX. (Acrobat is available free from CIC-2, 7-4357.)

#### **5.5.3. Web Access to SCISearch Database**

*[http://lib-www.lanl.gov/  
Electronic Database/](http://lib-www.lanl.gov/Electronic Database/)*



The Research Library (CIC-14) has a new database, SCISearch, which is based upon the Science Citation Index SCISearch Database, an international multidisciplinary index to science and technology literature produced by the Institute for Scientific Information.

#### **5.5.4. Network News Facilities**

##### **ClariNews**

ClariNews is an electronic newspaper containing professional news and information delivered to your computer in the “usenet” news format and is updated continuously all day long. You can receive ClariNews through a standard news reader if your system is so configured. Check with your system administrator for more information.

##### **USENET news**

USENET news is available from machine newshost.lanl.gov. You can access the news via several client news reader programs. Your machine must be registered in the LANL domain to read the news from newshost.lanl.gov.

## 6. LABWIDE BUSINESS INFORMATION SYSTEMS

Labwide business information systems provide access to a wide variety of operating information and tools to help manage administrative information and resources. The Labwide systems have been designed to serve a wide range of users including clerical and technical support staff as well as management and professional staff. Labwide systems are run on the IA and IB systems and can be accessed with PC, Macintosh, or UNIX workstations.

Labwide systems do not include all the computer systems available at the Laboratory. They are information systems that are used by people "Labwide" as opposed to information systems used for special interest groups or computer systems used for scientific computing. Some of the Labwide applications such as the Time and Effort Reporting System (T&E), Travel Reporting System (TRIPS), and Employee Information System (EIS) may be used by all employees. Other applications (Salary Review System, Payroll) are specialized and require specific authorities for access.

The Labwide systems you use will depend on the tasks you perform on your job. To use Labwide systems, you need the following:

- Communication links and the software to connect you to the computers where the Labwide systems reside (Section 2, Table 4),
- An ICN password and/or Smartcard to permit access to the IA and IB systems and the graphical user interface systems (Section 2, Table 6), and
- System authorities appropriate for the work you need to do.

The standard interface for LANL administrative systems has been character and screen oriented. There are now some GUI interfaces that can be used with some systems. The software to use these interfaces are available on-line. Call the Customer Service Center for assistance (665-4444, option 2). The following is a list of Laboratory-wide systems.



AC	Account Control	PF	Performance Appraisal
ACIS	Automated Chemical Inventory	PS	Personnel
OAG	Airline Guide	PAIRS	Property Accounting, Inventory, and Reporting
AF	Affiliate Information	PAID	Purchasing, Accepting, Invoicing, and Disbursing
AU	Authors	RP2	Receiving/Procurement Inquiry
BU	Budget Computing	SR	Salary Review
CE	Capital Equipment	SE	Secretarial/Contract Services
DW	Data Warehouse	SAS	Signature Authority
DR	Document Request	ST	Stores
EA	Electronic Authorization	TE	Time & Effort
EDS	Employee Development	TRIPS	Travel Reporting Information Planning
EIS	Employee Information		
FFP/WO	Facilities Project Information/Work Order		
FMIS/GA	Financial Management Information		
HMTT	Hazardous Material Transfer Tracking		
KCS	Key/Core		
MC	Mail Channels		

## 6.1. Authorities

To view or update information in Labwide systems, you need to have authorities unique to each system. Lab employees and most contract employees are given limited authority automatically to view their own data. Contract employees who work for companies not supported by Contract Staffing Services or Office Administration Services and who need access to applications should call Labwide Systems Support.

If your job requires you to see group or division information, you need additional authorities. In most cases, line managers assign additional authorities to their employees.

Call the Customer Service Center 665-4444, option 2, for help with system authorities.

## 6.2. Training, Documentation, and Consulting

*Computing At LANL/Training*



Classes are available monthly to people who use Labwide systems. Most are half-day classes. For information or to register for classes call 665-4444, option 4, or 7-9559. Course descriptions and scheduled class dates are on the Web.

Training is offered as needed for the following systems:

- ACIS
- Data Warehouse
- ED
- EI
- Eudora
- FMIS/GA
- HTML
- Infomaker Reports
- KCS
- Netscape
- On-line Forms
- PA
- Purchase Card
- SA
- SR
- ST
- T&E
- TR

*Computing at LANL/  
Documentation/Business  
Information Systems/Lab-Wide  
System User Guides*



Many of the systems have a reference card containing quick instructions for using the system (call 5-4444, option 2). You may also obtain a reference card or an entire document via the Web.

*Computing at LANL/  
CIC Groups.../CIC-6.../Services  
anf Teams/Lab-Wide Systems  
Consulting*



Consulting services are available.

## 7. SCIENTIFIC COMPUTING

### 7.1. Compute Servers

This section will help you choose the operating system and computer combination that is best suited to your computing needs by presenting a brief abstract for each operating system. Each abstract includes pertinent access information for each operating system, its typical uses, limitations, and characteristics.

The optimum system for a given computer application will vary with the characteristics of the code. The use of floating-point operations, the percentage of vectorized code, and the average vector length for the codes are some of these characteristics. Use the "Register" facility to obtain an account on the compute servers whose descriptions follow in Section 6.1.

- Log in to the Register facility [see Section 4.3.],
- Select Option 1 "Go to E-Mail and CIC service registration."
- From the subsequent menu select Option 2 "ICN Compute Servers."

A complete list of compute servers is found on the Web.

#### 7.1.1. Cray UNICOS

UNICOS is used primarily for scientific computing with emphasis on large programs that require extensive calculations and significant internal storage. UNICOS supports a software-rich environment for many traditional computing applications. Large memory allocations per user on UNICOS permit effective and efficient computing of large problems. You can perform multiple computing tasks (with some limitations) by moving processes to the background.

Documentation in support of UNICOS can be obtained by calling Cray Computer at (612) 683-5907.

The UNICOS operating system provides a UNIX-based System V environment which conforms to the POSIX 1003.1 standard. This includes Berkeley Software Design, Inc. (BSD) extensions to the System V and sessions (similar to BSD job support), symbolic links, long file names, and signal support.

Many performance tools are available with an X Windows System interface that makes hardware performance features much more accessible. The output of these tools can be shown and manipulated graphically, which allows you to interpret performance parameter relationships easily and optimize their codes.

UNICOS itself does not provide for magnetic tape input or output. You may read and write magnetic tapes through the EIS system (an extension of CFS), where they would be accessible from UNICOS.

A locally developed central processing unit (CPU) scheduling algorithm, known as Opportunity Scheduling is installed on all UNICOS systems. The objective of Opportunity Scheduling is to give users direct control over their available CPU time. By adjusting user-adjustable priorities and relative shares,



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*Computing at LANL/Documenta-  
tion/Technical/Subject  
Listing/UNICOS/UNICOS at Los  
Alamos User Guide*



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Alamos*

*Computing at LANL/Computing  
Services and Resources/UNI-  
COS/Opportunity Scheduling*



a user organization can ensure that its most important work is always completed, irrespective of the total load on the machine. (UNICOS previously used a process called the “fair share scheduler” to allocate resources).

*Computing at LANL/Computing  
Services and Resources/Charge  
Rates*



Computing costs are calculated by charging for the use of specific UNICOS resources based on whether the computing is interactive or batch-type as submitted through the production- or batch-workload manager.

### 7.1.2. Gamma YMP (UNICOS)

Gamma’s CPUs are identical to those on the other YMPs, and both Gamma and the other YMPs run on a 6.0-nanosecond clock. The charge rates are lower because Gamma uses a slower, less expensive memory technology known as “Dram.” Longer fetch times cause the CPU to spend more time waiting for data. The exact delay depends on the application, but on average processes take 15% longer to run. The reduced CPU charge for Gamma compensates for the longer CPU times, ensuring that, on the average, applications will cost the same to run on Gamma as they would on any other YMP.

An advantage of using Gamma is that there are two gigawords of 64-bit core memory—ideal for fine meshes and three-dimensional calculations. Smaller, open-partition jobs should be submitted to “rho”; your codes will often run faster.

### 7.1.3. Massively Parallel Supercomputing—T3D

The Cray T3D massively parallel supercomputer is a true multiple-instruction, multiple-data (MIMD) machine located in the secure environment. Previously, all massively parallel processor (MPP) code development in the secure ICN had been of the single instruction, multiple data (SIMD) variety provided by the Thinking Machines Corporation (TMC) Connection Machine 200. In SIMD machines, the same instruction is executed by every processor on a different set of data. MIMD machines such as the T3D and the TMC allow the execution of different instruction streams simultaneously on different sets of data.

The T3D has as its front end an 8-processor Cray YMP with 128 megawords of 64-bit static random access memory (SRAM) for operating system functions such as I/O and process management. The T3D and YMP, which are known collectively as machine Tau, provide 512 DEC Alpha EV4, 150 MHz processing elements (PEs) distributed over the high-speed “Torus” network. These PEs have access to 32 Gbytes of distributed SRAM memory, four times that available on the CM200.

The T3D is suited to jobs appropriate for an MPP system: your application must be parallel, it must be distributed among the processors efficiently, and it must keep all processors busy with useful work almost all of the time.

### 7.1.4. The Connection Machine CM-200

The Connection Machine CM-200 is a parallel computer built by TMC. The CM-200 consists of 65,536 bit-serial processing units, each with its own memory, interconnected by sophisticated routing circuitry. The system includes 2,048 Weitek floating-point chips for scientific computations (one per 32

processors), four high-speed frame-buffer displays, a 160-Gbyte mass storage system (the Data Vault), and a total of 8 Gbytes of RAM. Peak execution rates for 32-bit arithmetic approach 20 gigaflops for the full system.

Special validation is required to use the CM-200 which is accessed by logging on to a Sun front-end (CANYON/RENDIJA) via the ICN secure LAN.

The design of the CM-200 is SIMD, which means that each processor in the machine executes exactly the same instruction at exactly the same time, but on its own piece of data. Conditional operations are handled by masking processors on which the operation is not to be performed. In other terms, the CM-200 is a data-parallel computer in which a given operation is done on many data in parallel.

The full range of UNIX programming tools is available on the Sun front-end machines, but TMC also has provided enhancements to the Emacs editor for program development and a simulator that runs on UNIX, Symbolics, and Macintosh systems. The user program actually runs on a Sun front-end machine, with the CM-200 being fed a stream of instructions through a special interface in this machine. This instruction stream is read by part of the CM's hardware, which then orchestrates the parallel execution of the commands on all the processors. Data to be transferred into or out of the CM may be sent directly through the front-end or via the Data Vault, which has an Ethernet connection to the LAN.

### 7.1.5. Open Cluster

The Open Cluster is intended to offer you a low-cost alternative to the CRAY Y-MP. It is suitable for large-memory, parallel jobs with moderate I/O requirements. The cluster currently consists of eight IBM RISC System/6000 Model 590 workstations and two RISC System/6000 SP-2 running AIX, IBM's implementation of UNIX. Each node has a 66 Mhz clock. These machines are "super-scalars" meaning they can execute more than one command per CPU clock cycle. File size limitation is 2 Gbytes.

Charges for the ONCS are based on CPU time, memory, and disk usage. Check your resource usage by typing

```
/usr/local/bin/get_usage
```

#### 7.1.5.1. Converting Code to Run on a Cluster.

Code that runs on a UNIX workstation should run with minimal modifications on any individual node of either the open or secure cluster. The current approach for running in parallel among multiple nodes is to modify code to call the Parallel Virtual Machine (PVM) library, which takes care of all communications between machines. Alternatively you can use MPI, or if you are using FORTRAN, use high-performance FORTRAN (HPF).

#### 7.1.5.2. Balancing and Distributing Workload with Load Sharing—LSF.

The Load Sharing Facility (LSF) from Platform Computing Corp. is a load-sharing and distributed batch-queuing software suite. LSF integrates a network of UNIX systems to reduce interactive response time, increase batch through-



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Services and Resources/Cluster*

put, and improve computing resource accessibility while supporting parallel applications. LSF schedules jobs based on the availability and load of heterogeneous hardware and software resources as well as on the resource requirements of the jobs, ensuring that jobs run on the best available machines. Fully transparent remote processing of jobs is supported, including remote terminal I/O, signals, and file access. Job accounting data and analysis tools are also available. LSF is highly fault-tolerant and supports job checkpointing and migration. A Motif-based GUI to interface with LSF is also available.

The Open Cluster is accessed via Telnet, FTP, klogin, or kshell from another open machine. After you log on to the Open Cluster machines, you need a Kerberos ticket for CFS access. The available Kerberos commands are “k4init,” “k4rlogin,” “k4rsh,” “k4rcp,” “k4list,” and “k4destroy.” Accounts for new users are added manually.

### 7.1.6. Secure Cluster

For maximum efficiency and usability, the Secure Cluster has been configured with a front-end machine and 8 compute nodes. The front-end is a Hewlett Packard (HP) H70 with dual CPUs, 256 Mbytes of memory, and 4 Gbytes of redundant array of inexpensive drives (RAID) disks. Each of the compute nodes is an HP735 with 400 megabytes of memory (the maximum allowable for this architecture) and 4 Gbytes of RAID disks. All nine machines are currently interconnected via a fiber, distributed data interface concentrator. Currently, HP/UX (the HP version of UNIX) allows files as large as 2 Gbytes. Performance benchmarks are available by sending E-mail to cluster\_team@lanl.gov.

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Rates*



The use of a front-end interface allows separation of interactive and compute-intensive jobs. Although not currently enforced, the intention is that the front-end (HP-00) be used for interactive work, freeing nodes HP-01 through HP-08 to run non-interactive or batch jobs. This configuration provides a good environment for evaluating various schemes for load-leveling, an important consideration in a cluster environment.

Charges for the SNCS are based on CPU time, memory, and disk usage. Check your monthly resource usage by typing

```
/usr/local/bin/get_usage
```

You can estimate the cost for your usage by multiplying usage by charge rates.

Type `man get_usage` for more information. For charging purposes, set your default charge code in the secure ACS database. This can be done from a secure Cray with the command

```
acs set default
```

The Secure Cluster is accessed via Telnet, FTP, klogin, or kshell from another secure machine. After you log on to the Secure Cluster machines, you need a Kerberos ticket for CFS access. As on the open cluster, the available Kerberos commands are “k4init,” “k4rlogin,” “k4rsh,” “k4rcp,” “k4list,” and “k4destroy.” Accounts for new users are added manually.

PVM is installed on the Secure Cluster via a link to the secure info server. This link will provide the most up-to-date and architecture specific version of PVM.

#### **7.1.7. Virtual Memory System (VMS)—CCVAX**

The VMS is an interactive operating system used by the Digital Equipment Corporation Alpha family of computers. VMS is the operating system used with the CCVAX machine in the open partition and is a flexible and versatile operating system that provides a wide range of capabilities and is well suited for interactive applications.

Because of the general nature of the applications software, validation on CCVAX is available to the computing community at large for a monthly fee regardless of the CPU or memory resources used. Access to CCVAX is via Telnet. CCVAX does have a floating-point unit and can be used for limited scientific computing in the background mode, but it should not be considered for computation-intensive applications.

Each CCVAX user is typically provided with 1K blocks (1 megabyte) of permanent storage; however, no backup service is provided (use CFS for backup and archive storage). A scratch disk is also available that does not have the 1-megabyte storage limitation.

A nine-track magnetic tape unit is available on CCVAX, with densities of 1600 and 6250 bpi. A TK70 tape drive is also available.

#### **7.1.8. AIX—Beta**

The AT&T System V version of UNIX called “AIX” is currently used on the RS6000 computer named “Beta” with a maximum speed of 27 million instructions/second. Any ICN user can be validated on the Beta distributed processor for a small monthly fee. There is no time allocation associated with the use of UNIX.

This system is a general-purpose computer that provides for limited long-term storage. You should keep only those files that you are actively working on in your UNIX directories. Archival and backup files should be routed to the CFS.

AIX is a flexible and versatile operating system that provides a wide range of capability and is well-suited for interactive applications. Compiler construction aids include “YACC” and “LEX.” SMTP E-mail (Pine interface) and connection to external networks provide for file transfer and remote log-in.

## 7.2. Software Cross-reference Tables

Table 10. Languages, Libraries, Maintenance, and Debuggers

Component	UNICOS	CCVAX/VMS	Beta/UNIX	Cluster	CM200
<b>System Libraries</b>	ASDEF CFTLIB LIBSCI	STARLET RLIB VMSRTL	UNIX C LIB LIB.A numerous		
<b>Mathematics Libraries</b>	CRAYMATH IMSL	VAXMATH SAS	F77MATH LIBM	CLAMS MAPLE <sup>1</sup> MATHEMATICA <sup>1</sup>	CLAMS
<b>Graphics Libraries</b>	CGS, GKS CGSHIGH, RSCGI DISSPLA, SC4020 NCAR PXXLIB	CGS CGSHIGH DISSPLA NCAR PXXLIB	CGS CGSHIGH  PXXLIB	CGS CGSHIGH OPEN GL3D NCAR PHIGS ILW3D	
<b>Source Maintenance</b>	HISTORIAN BLS, LD	HISTORIAN	MAKE SCCS	GNUMAKE	
<b>Debuggers</b> <b>Static</b> <b>Dynamic</b>	CDBX, DBX LDB CTRACE	DEBUG	DBX, PDX ADB, LINT ADB, SDB	DBX XLDB GNUGDB	
<b>C</b> <b>Fortran 77</b> <b>Fortran 90</b> <b>Lisp</b> <b>Pascal</b> <b>Basic</b> <b>Cobol</b> <b>Perl</b>	C, SCC CF77, CFT77 F90  PASCAL	CC/CL FORTRAN  PASCAL BASIC COBOL	CC, GCC F77  LISP PC	C, C <sup>++</sup> , GCC, GCC <sup>+</sup> F77 F90 <sup>1</sup> , XL  Perl	C CMF  LISP

<sup>1</sup>open cluster only

**Table 11. ICN Accounting Information**

Utility	System Access	Function	Options and Features
<b>AUTOSUM</b>	UNICOS	Retrieves account information from “use” databases.	Interactive; permit accessing info by System, User, etc.
<b>COST</b>	UNICOS	Easy to use utility for extracting cost from “use” databases.	Numerous menus AUTOSUM database.
<b>ACS</b>	UNICOS	Reports account information; Sets charge code authorization.	Computes resource use Validates user charge codes.
<b>JA</b>	UNICOS	Detailed accounting for jobs.	Many options, see MAN page.

**Table 12. ICN On-line Help Information**

Facility	System	Function	Options and Features
<b>WWW</b>	local	Browse LANL or the Internet.	Use Mosaic/NetScape Browsers.
<b>MAN</b>	UNIX UNICOS	Quick reference information about utilities and command syntax.	Lists commands and keywords. Displays info for commands.
<b>CLAMDOC</b>	UNICOS VMS/Cluster	Mathematical Library Information.	Retrieval by routine name, category, or keyword.

**Table 13. Text Editors**

Editor	Systems	Key Options
<b>VI</b>	UNIX	Standard UNIX editor, multiple file access, subset of EX editor.
<b>Visual Editor</b>	UNICOS	Automatic indent and tab set.
<b>EDT</b>	VMS	Standard VMS editor, three modes, Online help. Journal facility. Multiple file access. Predefined variables. MACRO extensions.
<b>EMACS</b>	UNICOS Cluster	Cray supported.
<b>FRED</b>	All	Standard ICN line editor, DO loop extensions. Strong command set Conditional IF functions.

## 7.3. Graphics Facilities

### 7.3.1. Device-Independent

At Los Alamos, the graphical display of data has become an important scientific tool for users of the ICN. Device-independent computer graphics are provided on most of the computing systems at Los Alamos by the Common Graphics System (CGS) and various graphics libraries. CGS provides a foundation for your application programs and higher-level plotting libraries by providing two-dimensional, device-independent graphics primitives. Higher-level graphics libraries built on top of CGS include CGSHIGH, DISSPLA, and the SC4020 emulation library.

CGS is an evolving product; it was designed to adapt to changing display technology and computing environments while remaining general purpose, flexible, and easy to use. It provides a constant interface to device-level graphics in a changing world. Device formats currently supported by CGS include the X Windows System, Silicon Graphics Distributed GL, SunWindows, Tektronix terminals and emulators, PostScript, and the CGS metafile. The CGS metafile is a device-independent representation of graphics that can be plotted on PAGES graphics devices or postprocessed by PSCAN and displayed on any CGS-supported graphics device. We support CGS on UNICOS, the cluster, VMS, ULTRIX, OSF1, and all of the workstations using the UNIX operating system at Los Alamos.

CGS supports graphics primitives including points, lines, polygons, and text. Both hardware and software text are supported including 19 fonts with text size and orientation control. Many primitive attributes are supported including line style, line width, intensity, direct color, and indexed color. Interactive cursor input is supported on interactive devices. All of this is done in a way that allows your application program to remain independent of any specific graphics device. In addition, device-specific features are available if needed via a CGS escape function.

*Computing at LANL/CIC-8.../  
Graphics & Visualization  
Software/ Software at a Glance*



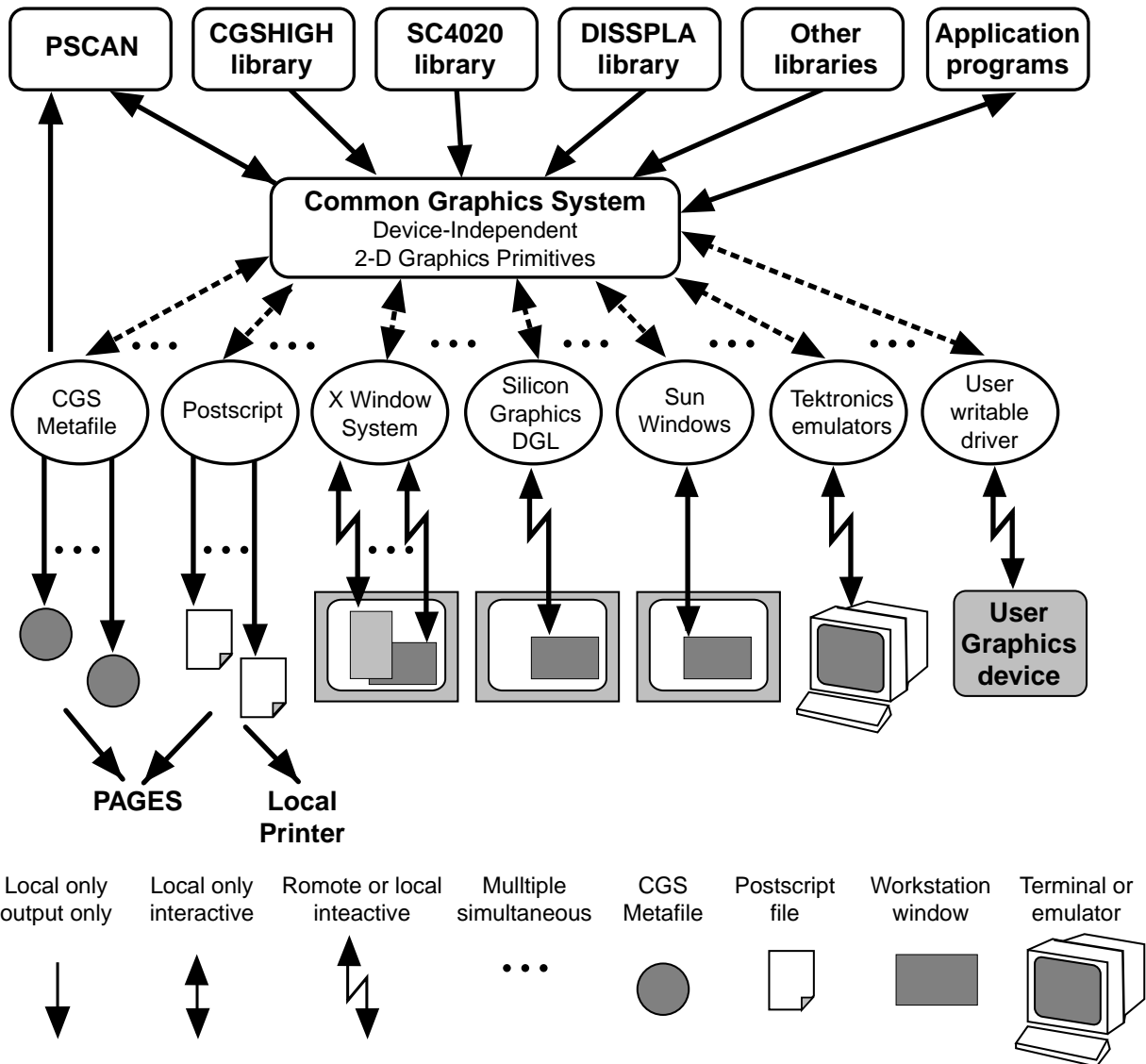
An excellent table that summarizes the various graphics libraries, utilities and postprocessors is found on the Web.

### 7.3.2. Graphics Devices

Most of the popular capabilities of the various graphics devices that are supported include the ability to display sequences of plots as movies, to have multiple simultaneous windows open, to resize plots within windows automatically, to control multiple windows on more than one workstation from a single process, and many other features as appropriate to the device. CGS also provides a mechanism for the user to write his/her own CGS device driver for non-standard graphics devices.

You can plot on one or more devices simultaneously or selectively control which device is to receive graphics output. The process of selecting a different graphics device is as simple as changing a subroutine call to select that device. Many new and older CGS applications are gaining access to X Windows and

## Current Structure of CGS



PostScript with a minimum of effort. The average FORTRAN or C programmer spends less than half an hour converting an application program to X Windows and PostScript output.



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Centers.../CIC-17 Media/ PAGES

## 7.3.3. Virtual Reality (VR)—CIC-8

VR is a form of computer graphics that seems to immerse the user in a synthetic space. This is done by using the following:

- One or more computer-graphics-rendering engines for generating viewable surfaces,
- Head-mounted display for viewing the virtual world while masking out the real world or, alternatively,

- 3-D liquid crystal glasses for viewing stereoscopic images projected onto a screen,
- Data gloves and body suits for detecting positions and movements of the participant,
- Position trackers to measure the location and orientation of the head and perhaps other objects,
- 3-D sonification for creation of an aural environment, and
- Voice recognition equipment.

[http://www-c8.lanl.gov/graphics\\_vis/vis\\_video\\_lab/map.html](http://www-c8.lanl.gov/graphics_vis/vis_video_lab/map.html)



The VR machine allows you to have the experience of being “inside” the model. By using the kinematics of your body to move around the model, the VR machine greatly enhances the understanding of spatial interrelationships.

#### 7.3.4. Visualization/Video Laboratory—CIC-8

The Visualization/Video Laboratory can help you sort through the many choices available to leverage this powerful technology efficiently. Visualization/video services include the following:

- Consulting and assistance on visualization tools, techniques, software, and methods;
- Coding of specialized routines for project specific goals;
- Animation production from computer-generated data including recording facilities for PAGES production videos;
- Interactive recording sessions directly from workstation screens;
- Editing, titling, and audio dubbing of visualization videos;
- Creation of digital video for delivery via the Internet; and
- Translation between various graphics file formats.

[http://www-c8.lanl.gov/graphics\\_vis/vis\\_software/vis\\_sw.html](http://www-c8.lanl.gov/graphics_vis/vis_software/vis_sw.html)



[http://www-c8.lanl.gov/graphics\\_vis/vis\\_video\\_lab/vis\\_lab.html](http://www-c8.lanl.gov/graphics_vis/vis_video_lab/vis_lab.html)



Work in the Visualization/Video Laboratory relies on a mix of software from three categories: locally developed, freeware/shareware, and commercial. A list is also maintained of the various software in use at visualization laboratories around the country.

#### 7.4. Mathematical Software Libraries

CIC Division maintains a large and valuable collection of mathematical and statistical software. Many of the libraries mentioned below are available from the “netlib” facility at Oak Ridge National Laboratory. Any source code available through this Mosaic interface is free of charge, but it will not be guaranteed.

Below is a list of Los Alamos’ mathematical and statistical libraries that are available on various computers maintained by CIC Division.

- General mathematics and statistics—IMSL (on Cray PVPs)
- Eigensystem solvers—EISPACK (in CLAMS)
- Linear Equation Solvers—LINPACK (in CLAMS)
- Nonlinear Equation Solvers—MINPACK (in CLAMS)
- Ordinary Differential Equations—ODEPACK (in CLAMS)
- Technical Computing Packages—Mathematica and Maple

<http://www.netlib.org>



### 7.4.1. Common Los Alamos Mathematical Software (CLAMS)

The philosophy of CIC Division is to provide and maintain a common library of all supported mathematical software routines. Mathematical software libraries for the major ICN systems are built from this common source. CLAMS is a result of this philosophy.

The CLAMS library consists of most of the routines in the SLATEC Common Math Library as well as routines unique to Los Alamos. The CLAMS library and associated documentation is on the CIC Division “icn-tools” information server. Currently supported platforms are as follows:

- Cray UNICOS,
- DEC Vaxes running VMS,
- DEC Alphas running Open VMS,
- HP series 700,
- IBM RS 6000,
- Silicon Graphics, and
- Sun.

By mounting the appropriate files from “icn-tools,” you will have access to the latest version of CLAMS without using local disk space. CLAMDOC is an interactive on-line documentation program that provides retrieval by routine name, category number, or keyword(s). The utility may be accessed by entering the command “clamdoc” at your terminal. On the DEC machines, the on-line documentation utility “clamdoc” is available, and on the UNIX machines, “clamdoc” and the “man” pages for both CLAMS and clamdoc are available. To access files on “icn-tools,” contact your local system administrator. Find this software on the Web.

On UNIX systems, assuming that the files exported from “icn-tools” are in /usr/lanl on the local machine, you should have /usr/lanl/bin in your path variable, /usr/lanl/lib in your LD\_LIBRARY\_PATH environment variable, and /usr/lanl/man as your MANPATH variable. On Sun workstations, you should be using /mathlib/clams/unix.

On CFS under /ccx/sun you will find clams.tar and clamdoc.tar. Use the command “untar” and check out the “readme” or “make” files. ClamdoC is the documentation program for the clams library.

The SLATEC source is available from the Web.

New CLAMS Documentation is available on the Web.



*Computing at LANL/CIC  
Groups.../CIC-8.../Graphics &  
Visualization.../Math software*



*[gopher://netlib2.cs.utk.edu/11/slatec](http://netlib2.cs.utk.edu/11/slatec)*



*<http://www.netlib.org/80/slatec/>  
<http://www.netlib.org/liblist.html>*



*[http://www-c8.lanl.gov/dist\\_comp2/MATH/clams.html](http://www-c8.lanl.gov/dist_comp2/MATH/clams.html)*

### 7.4.2 IMSL

IMSL is a commercial, proprietary subprogram library developed by Visual Numerics, Inc. It contains about 4000 FORTRAN subprograms that handle a variety of mathematical and statistical problems. The user command “`imsldoc`” exists on UNICOS and is the equivalent, for the IMSL library, of CLAMDOC.

The primary usefulness of IMSL for Los Alamos users is in its extensive statistical library, which includes data reduction, multivariate analysis, sequential analysis, random-number generation and probability distribution, permutations and combinations, subset generators, nonparametric statistics, and hypothesis testing. IMSL also provides some subprograms not available in CLAMS, such as operations on polynomial splines, elliptic integrals and functions, and methods for two-point boundary problems.

### 7.4.3. Mathematica and Maple

Mathematica and Maple are available on the open cluster. Both are software systems for numerical, symbolic, and graphical computations and visualization. Engineers, scientists, financial analysts, researchers, professors, and college and high school students worldwide apply both to critical projects for reliable answers. Both deliver an interactive calculation tool and versatile programming language for fast and accurate solutions to technical problems. Mathematica’s electronic documents called “notebooks” let you easily organize your text, computations, graphics, and animation for impressive technical reports, presentations, or records of your work. And you can use MathLink, Mathematica’s communication protocol, to exchange information between Mathematica and other programs. Mathematica is available for over 20 computer platforms.

## USER SURVEY

Please indicate which platform you are using.

\_\_\_\_\_Macintosh      \_\_\_\_\_PC      \_\_\_\_\_UNIX

Please rank the main uses of your computer and associated computer networks from 1 to 4, with 1 being the main use.

\_\_\_\_\_administrative      \_\_\_\_\_graphics  
\_\_\_\_\_scientific computation      \_\_\_\_\_word processing

1. The document is logically organized. \_\_\_\_\_yes      \_\_\_\_\_no

If not, how should it be reorganized? \_\_\_\_\_  
\_\_\_\_\_

2. It is easy to find what I am looking for in the document. \_\_\_\_\_yes      \_\_\_\_\_no

If not, how can it be improved? \_\_\_\_\_  
\_\_\_\_\_

3. The information in the document is easy to understand. \_\_\_\_\_yes      \_\_\_\_\_no

If not, which information is confusing? \_\_\_\_\_  
\_\_\_\_\_

4. Terms are defined whenever necessary. \_\_\_\_\_yes      \_\_\_\_\_no

If not, which terms, and where should they be defined? \_\_\_\_\_  
\_\_\_\_\_

5. The network paths suggested take me where I need to go. \_\_\_\_\_yes      \_\_\_\_\_no

If not, which ones didn't work? \_\_\_\_\_  
\_\_\_\_\_

6. The Web addresses take me where I need to go. \_\_\_\_\_yes      \_\_\_\_\_no

If not, which ones didn't work? \_\_\_\_\_  
\_\_\_\_\_

Would you rather see separate documents for users of Macintoshes, PC, and UNIX machines? \_\_\_\_\_yes      \_\_\_\_\_no

Please give us any other comments or complaints you have about this document.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Your name (optional) \_\_\_\_\_

Your group \_\_\_\_\_

**CIC-6 Customer Service**

**MS B251**

Los Alamos National Laboratory

Los Alamos, NM 87545

NATIONAL LABORATORY

# INTEGRATED COMPUTING NETWORK (ICN) VALIDATION REQUEST

To access ICN Computing resources, please complete all parts of this form that apply to you, including "Special Requirements."

If you have questions: Call: (505)665-1805  
E-mail: [validate@lanl.gov](mailto:validate@lanl.gov)

Mail your completed application to:  
ICN Password Office (PWO)  
Mail Stop: B271  
Los Alamos National Laboratory  
Los Alamos, NM 87545

All Laboratory computers, computing systems, and their associated communication systems are for official business only. By completing this request, users agree not to misuse the ICN. The Laboratory has the responsibility and authority to periodically audit user files.

## Owner Information

Z-Number (if you have one)	PWO Use Only	Name (Last, First, MI)	
LANL Group	LANL Mail stop	Citizenship (Foreign National see Special Requirements-Foreign National)	
LANL Phone Number (       )       -		Cost Center	Program Code

**Check LANL affiliation:**

☐ LANL Employee

☐ Contractor \_\_\_\_\_  
(specify contract company)

☐ Consultant, VSM, associate

☐ External user \_\_\_\_\_  
(specify employer)

☐ Other (specify) \_\_\_\_\_

**Send password/smartcard to:**

☐ Mail stop       or       ☐ Address below

Name/Organization		
Address		
City	State	ZIP Code

**Access** Check access method and needed partitions:

<b>Access method:</b> <input type="checkbox"/> ICN Password <input type="checkbox"/> Smartcard <input type="checkbox"/> Both	
<input type="checkbox"/> <b>Open</b> partition (email systems, open machines, etc.)	
<input type="checkbox"/> <b>Administrative</b> partition (Lab-wide business information systems) If you are not a Q-cleared LANL employee, see required steps in section "Special Requirements-Administrative Partition," unless you already have administrative access with an ICN password.	
<b>Secure</b> partition (secure machines)  Indicate levels of data to be processed:  <input type="checkbox"/> Secret <input type="checkbox"/> Unclassified	<div style="border: 1px solid black; padding: 10px;">         I certify this person requires secure access:   <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 60%; border-top: 1px solid black; text-align: center;">           Manager Signature (Group Leader or above)         </div> <div style="width: 35%; border-top: 1px solid black; text-align: center;">           Date         </div> </div> </div>
NOTE: A Q-clearance is required. All classified computing must be performed within the secure environment.	

**PWO Use Only**

New	Change	Clearance Status	Processed	LV	Smartcard Serial #
Comments:					

# Special Requirements

## Administrative Partition

(U.S. Citizens Only) Laboratory-wide Systems [ IA (BUCS, Stores, Travel), IB (EIS, FMIS, PAIRS)]

☐ Under 18 years of age

If you need to access administrative systems, your group leader must provide a memo accepting responsibility for your actions and justifying your need for access. This memo is to accompany all forms taken to the security briefing (see "Contractor or Non Q-Cleared" section below). You may not access the Secure Partition.

☐ Non cleared

Phone (505) 667-9444 to obtain an Authorization Packet.  
Phone (505) 667-9153 to schedule a security briefing.  
Bring all forms, including this ICN Validation Request, to the Security Briefing for approval.

Security Briefing Approval Signature

Date

☐ Foreign National

Attach a copy of Form 982 (Request for Unclassified Visit or Assignment by a Foreign National) with all approval signatures. Be sure Box #11 of Form 982 is completed. If you are not a visitor/assignee under a LANL/DOE approved Visit/Agreement Request, attach written justification from your host Division Director describing your need to access the ICN.

## Authorization (required)

Print Manager Name (Group Leader or above)

Manager Z-Number

Group

Manager Signature (Group Leader or above)

Mail Stop

Date

If you are not a LANL employee, obtain your LANL contact's signature in addition to the signature of the contact's manager.

NOTE: LANL contacts are regular Laboratory employees. Contacts are responsible for obtaining annual re-authorizations, forwarding renewals, and notifying the ICN Passowrd Office of changes in user or contct status.

Print LANL Contact Name

Contact Z-Number

Phone Number

Group

LANL Contact Signature

Mail Stop

Date

***We wish to express our appreciation to the many people who contributed information to this issue and to those who gave their time to review its content.***

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**<http://www.lanl.gov/Internal/divisions/cic/news.html>**

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